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Effect Of Circular Manufacturing On The Performance Of Manufacturing Firms In Kenya

Talal Mohamed Abadi
Phd Student, Department Of Business Administration, Technical University Of Mombasa.

Dr. Samson Kitheka
Senior Lecturer, Department Of Business Administration, Technical University Of Mombasa.

Dr. Anwar Hood
Senior Lecturer, Department Of Business Administration, Technical University Of Mombasa.

Dr. Mary Ibua
Senior Lecturer, Department Of Business Administration, Technical University Of Mombasa.

Abstract
Over the decades, manufacturing organizations have relied on a linear extraction approach which has enlightened the threat of resources depletion. The inception of circular supply chain is vested on the business model of producing products and flow of materials along the supply chain members. The study sought to determine the effect of Circular manufacturing with policy framework as a moderating effect on the performance of manufacturing firms in Kenya. Data was collected by the use of a questionnaire. The target population was 1105. Stratified random sampling was used. The hypothesis in this study was tested to determine the P-value. Data was analyzed by use of SPSS (V.20) while presentations was done by tables and graphs. The study found out that circular manufacturing has a significant effect on the performance of manufacturing firms in Kenya.

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I. Introduction

Background Information

In Kenya, the adoption of various policy frameworks has contributed to the development of a supply chain that is more circular. Every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. This right is outlined in the Bill of Rights, which is found in chapter Four of the Constitution. In various other chapters and clauses, it is declared that every Kenyan has the right to appropriate sanitary standards, safe water, and sustainable land management, amongst other things (CoK, 2010).

Waste management was singled out as a critical problem facing the nation that required immediate attention in the country's Vision 2030 document. The management of plastics was identified as a major project that required immediate attention and needed to be handled through public-private partnerships (Kenya Vision 2030). The Environmental Management and Coordination Act (EMCA) provides for environmental protection through; Environmental impact assessment; Environmental audit and monitoring, Environmental restoration orders, conservation orders, and easements. Some of its provision include Ban on plastic carrier bags, Plastic ban in protected areas, Extended Producer Responsibility (EPR) Regulations 2020 and the revision of the building code. Other policies that help in this transition include Waste Management Regulations 2016, National Solid Waste Management Strategy 2015, The Green Economy Strategy and Implementation Plan (GESIP), Nationally Appropriate Mitigation Actions (NAMAs), Bio-energy strategy 2020-2027.

Problem Statement

Kenya's manufacturing sector is a model of mutually beneficial cooperation. In a circular supply chain, recycling technology is always improving, which aids in the creation of a society with less carbon emissions (Cucciniello & Cespi, 2018). Companies that produce goods rely heavily on imported raw materials and require expensive transportation and logistics services, both of which increase the cost of production (KAM, 2019). In order to increase operational efficiency and hence handle these problems, circular supply chain strategies should be implemented fully.

Sustainability in the supply chain is nothing new, and many academic papers have been written about tried-and-true approaches like sustainable SCM, green SCM, and closed loop SCM. CSCM, or the integration of circular thinking into the management of the supply chain and its surrounding industrial and natural ecosystems, as defined by Farooque *et al.,* (2019), is in its infancy. In contrast to more conventional ideas of supply chain sustainability, CSCM takes a zero-waste approach (Veleva *et al.,* 2017) and allows for value recovery, not just inside the original supply networks, but also across supply chains through cross-sector collaboration (Genovese *et al.*, 2017; Weetman, 2017). Moreover, the interaction of CSCM with business performance, remains mainly unexplored in the academic literature (Govindan *et al.,* 2020; Agrawal *et al.,* 2019).

Sustainable supply chain methods such as waste management, reverse logistics, and green procurement have received the majority of attention in Kenyan research. However, there is no study that tackles the idea of circular supply chain in its wholistic form. Ochiri, Wario, Odhiambo, and Arasa (2015) investigated the impact of waste-reduction methods on the success of Kenyan publishing enterprises. The results of the study showed that cutting waste raised productivity levels in businesses. Researchers Malaba, Ogolla, and Mburu (2014) looked at how sugar factories in Kenya rely on a network of suppliers that are environmentally sensitive. The results also demonstrated that when businesses implement green supply chain management, they make more profitable pricing decisions. David and Shalle (2014) examined the impact of reverse logistics evaluation on the supply chains of Kenyan manufacturers.

Objectives of the Study Objectives

i. To determine the effect of circular manufacturing on the performance of manufacturing firms in Kenya.
ii. To analyze the moderating effect of Policy framework on the relationship between circular manufacturing and performance of manufacturing firms in Kenya.

II. Literature Review

Theoretical Framework

This is an ideological in-depth reasoning by previous researchers on a specific area of study. This study was pinned on relevant schools of thought such as Natural Resource Based View, Institutional Theory and Contingency Theory.

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Natural Resource Based View (NRBV)

Invented by Barney (1991), the NRBV affirms that firm's resources and capabilities can provide a basis for competitive advantage, and that natural resources are one such resource that can be leveraged for competitive advantage. The Natural Resource Based View (NRBV) is a management framework that suggests that a firm's unique set of natural resources can be a key source of competitive advantage. This view is based on the idea that natural resources, such as raw materials, land, water, and energy, are essential inputs for economic activities, and that their scarcity and uniqueness can give rise to competitive advantages for firms. The NRBV framework suggests that firms can create value by effectively managing their natural resources in ways that are difficult to imitate by competitors. For instance, Barney indicated that a firm that has access to unique or rare natural resources can use them to develop innovative products or services that are difficult for competitors to replicate. Alternatively, a firm that is able to manage its natural resources more efficiently than competitors can reduce its costs and increase its profitability.

Institutional Theory

The proponents of Institutional Theory (Hamilton, 1919; Yonaya, 1998) have opined that Institutions School of Thought provides an understanding on how organizations should navigate rules and norms within their operations so as to survive. The proponents have moreover provided that organizational growth is dependent on how they can adopt to the recurrent rules, policies and regulations in the environment whereby the institutional isomorphism must be realized. The Theory embraces Social Legitimacy through the adoption of social traditions and norms predominant in the legal system since every institution is guided by the legal framework (Zeng *et al.,* 2017). The proponents further indicted that Institutions has no option but to adopt the policies and practices in their operations as indicated by Zeng *et al.* The concept of circularity is governed by social norms, cultural perspective and political models in the society. An analysis done by Bocken *et al.,* (2016) indicated that firms tending to adopt circular chain are constrained with policies of linear supply chain and thus there is need for government involvement to create favorable policies for the adoption circular chains. Ghisellini *et al.,* (2016) on the Institutional analysis indicted that there is a vacuum in terms of weak property rights, policies for circular and better framework standards for a sustainable Institutional policy for a collaborative alignment of different firms.

Circular Manufacturing and Organization Performance

The OECD reports that manufacturing process has a major impact on the environment. In response, the manufacturing sector has been incorporating CE and other environmentally responsible production techniques into its supply chains (Moktadir *et al.*, 2018) It is widely acknowledged that cleaner production is a crucial CE practice for today's businesses (Ghisellini et al., 2016; Sousa-Zomer et al., 2018). Producing goods with a positive impact on the environment through their use (such as renewable energy and green building products) is just one aspect of sustainable manufacturing (Haapala *et al.*, 2021).

The adoption of methods like input substitution and technological advancements is crucial in the quest for cleaner production (Zomer, Thayla; Magalhes; Zancul; Campos; Lucila; Cauchick-Miguel; Paulo; 2017). To achieve Cleaner Production, it may be helpful to modify the input materials in order to reduce or eliminate the use of potentially harmful substances. Alterations to the input materials used can also prevent the creation of hazardous waste during manufacturing. Alterations to the input materials can take the form of either material purification or material substitution.

The focus of recent technological developments has been on streamlining production processes and updating outdated machinery in order to cut down on waste. Alterations in technology might be very simple, requiring only a few days to implement with minimal expense, or quite complex, necessitating significant upfront investment to replace entire processes. Process conditions including flow rates, temperatures, pressures, and residence periods can be altered, as can the production process itself, as can the installation of new equipment, the redesign of a facility's layout, or the application of automation technology.

Since the populations of emerging countries are growing far more rapidly than those of wealthy countries, more energy is required to provide goods for these rising populations. This is true for transportation, heating, power, etc. Supplying energy based on fossil fuels may experience price increases as a result of increasing demand, making energy saving/reduction strategies in production and the usage of appropriate equipment all the more crucial (Sung,Doo-Man & Won-Shik Chu 2020).

The energy-intensive manufacturing industries (bulk chemicals, refining, paper products, iron and steel, aluminum, food, glass, and cement) account for roughly two-thirds of industrial delivered energy consumption, but only produce about a quarter of the total dollar value of industrial shipments (Rovinaru *et al.,* 2019).

Opportunities to reduce energy use must be weighed against the other environmental and social sustainability implications of production. When energy conservation measures are complementary to other aspects of sustainability, such machine and motor efficiency, operator training, HVAC efficiency, process heating and cooling efficiencies, and recycling and remanufacturing, tradeoffs of this nature can be avoided.

According to research by Kirchherr, Reike, and Hekkert (2017), it takes 250 gallons of water to print one newspaper, but it takes 100,000 gallons to manufacture one car. There is significant space for improvement in the efficiency of the water used in modern manufacturing processes for cooling, quenching, cleaning, and delivering process chemistry. While factories aren't the biggest users of water, they are among the biggest polluters. Industrial cleaning, lubrication, and coating procedures are major contributors to the presence of volatile organic compounds (VOCs) and heavy metals in water sources. Biochemical oxygen demand, fatty acids and nutrients are only some of the byproducts of industrial processes that degrade water quality. The U.S. Environmental Protection Agency (EPA) proposed the Metal Products and Machinery Rule to mandate oil and grease disposals below 17 mg/L in response to water pollution issues in the metals industry. Achieving this requirement will dramatically raise on-site treatment and disposal expenses due to the high oil and grease levels that can be present in factory water effluents. There has been a significant shift among manufacturers in the United States, the European Union, and Japan toward decreasing the use of fluids in manufacturing due to disposal concerns, as well as health and financial costs connected with maintaining manufacturing fluids and chemicals. Dry machining, minimum quantity lubrication, powder coating, and other finishing procedures are examples of dry or near dry processes that are undergoing significant research and development (Masi, Day & Godsell, 2017).

In their examination of the causes and consequences of industrial air pollution, Sutherland *et al.,* (2020) zeroed in on the effects of particulate matter in the workplace. Asthma, emphysema, silicosis, and lung, laryngeal, and urinary tract cancers were among the illnesses mentioned. Air pollution restrictions in the United States' industrial sector are governed by laws that have already been outlined. Worker health isn't the only thing negatively impacted by air pollution; the ecosystem suffers as well. Consuming fossil fuels, burning coke, etching semiconductors, and sourcing raw materials all contribute to global warming. Fugitive emissions of ozone-depleting chemicals (such as those found in refrigerators, rocket fuel, and spray foam insulation), photochemical ozone-creating chemicals (such as those found in paint fumes, cleaning solvents, and combustion byproducts), and toxics (such as metals from foundries and coal combustion, etchant gases, fumes from fuels and solvents) all contribute to air pollution. Industrial air pollution comes from a wide range of sources. Welding (fumes and nanoparticles), machining/grinding (mists of chemicals, microbial byproducts, and metal particulates), casting (microparticles and organic chemicals), electronics production (toxic and greenhouse gases), and polymer production are all processes that contribute significantly to air pollution, (fugitive particulates and toxic organic exposure) as stated by Ghisellini, Cialani, and Ulgiati (2016).

Empirical Review

Various theoretical frameworks, such as Cradle to Cradle (McDonough & Braungart, 2020), the Laws of Ecology (Commoner, 2018), the Looped and Performance Economy (Stahel, 2017), and Regenerative Design, have contributed to the current understanding of the Circular Economy (Lyle, 2018). Biomimicry (Benyus, 2019), the Blue Economy (Graedel & Allenby, 2020), and Industrial Ecology (Graedel & Allenby, 2020) (Pauli, 2021). Waste is reduced and product value is maintained for as long as possible under the circular economic model (European Commission, 2020). With no specific circular loop in mind, the butterfly graphic instead emphasizes the interconnectedness of biological and technical closed loops as a continual flow of materials across the value circle (Ellen MacArthur Foundation, 2018).

III. Research Methodology

Research Design

This study was conducted through descriptive research design. This research study was guided by the philosophy of positivism. The target population for this study comprised of manufacturing firms in Kenya as registered with Kenya Manufacturing Association (KMA). The registered manufacturing firms in Kenya are totaling to 1105 firms (KAM, 2020 - 2021). Using the stratification of population, the respondents were the heads of supply chain from the selected manufacturing firms. Using the Yamane's formula in calculating the sample size, a total of 294 manufacturing firms were used as a representation in this study. The respondents from each sector sampled was the head of supply chain. Questionnaires was formulated in the Likert Five Scale Format, with close-ended questions. Additionally, questionnaires were provided as a point of reference and credible evidence to the information provided.

IV. Research Findings And Discussion

Results and discussion

The reliability of the data collection tool was tested first before further analysis was carried out on the data. This was done using Cronbach's Alpha where values of more than 0.7 indicate that the tool is reliable. The results of reliability are presented in Table 1.

Table 1 Reliability

Variable	Number of Items	Co-efficient Alpha	Comment
Circular Manufacturing	7	0.814	Accepted
Policy framework	5	0.896	Accepted
Organizational performance	8	0.881	Accepted
Overall	20	0.919	Accepted

Table 1 shows that the tool was reliable since all the variables has a reliability coefficient of more than 0.7

Relationship between Circular Manufacturing and Organization Performance

One of the objectives of this article was to determine the relationship between the relationship between circular manufacturing and organization performance. Pearson correlation coefficient was computed with absolute values close to 1 implying strong relationships. The results obtained are presented in Table 2.

Table 2 Correlation between Circular Manufacturing and Organization performance

		procurement	performance
Procurement	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	258	
performance	Pearson Correlation	.565**	1
	Sig. (2-tailed)	.000	
	N	258	258
**. Correlation is significant at the 0.01 level (2-tailed).			

The results given in Table 2 shows that a strong significant positive relationship between circular manufacturing and organization performance ($\rho = 0.645, \text{p value} = 0.000$) exists. Therefore, an increment in circular manufacturing will result in a significant increase in organization performance.

Influence of Circular Manufacturing on organization performance

The key assumptions of classical linear regression were examined before the regression model was fitted between circular manufacturing and organization performance. A linear regression model between circular manufacturing and organization performance was first fitted (model 1) before policy framework was introduced as a moderating variable (model 2). Tables 3, 4 and 5 present the regression results.

Table 3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.565[a]	.320	.317	.68491
2	.718[b]	.515	.510	.58026
a. Predictors: (Constant), manufacturing				
b. Predictors: (Constant), manufacturing, Policy, manufacturing _ Policy				

Model 1 of Table 3 shows that 32% of all the changes in organization performance are accounted for by the relationship between circular manufacturing and organization performance. Other factors not in the model explain 68% of all the variations in organization performance. When policy framework was introduced as a moderating variable, this predictive power increased by 19.5% to 51.5%.

ANOVA table as obtained to help test the hypothesis that circular manufacturing has no influence on organization performance. The results obtained are presented in Table 4.

Table 4 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.411	1	56.411	120.253	.000[b]
	Residual	120.090	256	.469		
	Total	176.500	257			
2	Regression	90.979	3	30.326	90.070	.000[c]
	Residual	85.521	254	.337		
	Total	176.500	257			
a. Dependent Variable: performance						
b. Predictors: (Constant), manufacturing						
c. Predictors: (Constant), manufacturing, Policy, manufacturing _ Policy						

In both models (1 and 2) there are significant influences of the independent variable on the dependent variable since the p values are less than 0.05. From model 1 the F statistics value was 120.253. This F value reduces to 90.070 in model 2 though the P value remains the same. Regression coefficients were computed and results given in Table 5.

Table 5 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.055	.178		11.522	.000
	manufacturing t	.562	.051	.565	10.966	.000
2	(Constant)	-.079	.411		-.192	.848
	procurement	.906	.135	.911	6.695	.000
	Policy	.830	.118	1.115	7.052	.000
	manufacturing _ Policy	-.158	.036	-1.068	-4.416	.000
a. Dependent Variable: performance						

Results in Table 5 shows that circular manufacturing has significant influence on organization performance. The resulting regression model is given by equation 1 as

$$Y = 2.055 + 0.562X \quad (1)$$

Equation 1 shows that for every change in circular manufacturing performance increases by 56.2% keeping other factors constant.

The introduction of policy framework in model 2 makes circular manufacturing to have significant influence on organization performance since it has a p value of less than 0.05. It can be concluded from Table 5 that policy framework has significant negative moderating effect on the influence of policy framework on organization performance since the p value of interaction variable is less than 0.05. The resulting model is given by equation 2 as

$$Y = 0.906X + 0.830Z - 0.158XZ$$

V. Summary, Conclusions And Recommendations

Summary of Findings

The main objective of the study was to find out the influence of Circular manufacturing on organization performance among manufacturing firms in Kenya. The study also sook to determine the moderating effect of policy framework on relationship between circular manufacturing and organizational performance

Discussion of findings

The objective of the study sought to establish the influence of Circular Manufacturing on procurement performance. The indicators that were considered for circular manufacturing were the elements of Technology and Input usage with most of the indicators having high mean scores from the respondents. The correlation analysis results showed that the relationship between Circular Manufacturing and organization performance was positive and significant. A unit increase in Circular Manufacturing led to increase in organization performance as indicated by the regression results. From the inferential statistics, there was enough evidence to justify the rejection of the third null hypothesis (H03) indicating that Circular Manufacturing significantly influenced the organization performance among the manufacturing firms in Kenya.

The responses to the different opinion statements showed that through Circular Manufacturing, Input was substitution, Technology changes were made, Energy and water use was regulated and there was Reduced Pollution. On Aggregate, the responses showed that Circular Manufacturing had a significant influence on organization performance. The respondents also explained that timely provision of information sought by suppliers largely boosts the confidence that the suppliers have for the organization. They also sighted challenges such as lack of information technology infrastructure and leaking of confidential information by some of their employees.

Conclusion

On the basis of the results, it was concluded that circular manufacturing positively and significantly influenced organization performance of manufacturing firms. This is because the correlation results indicated that there was a significant positive correlation between procedural justice and procurement performance. The regression results showed that a unit change in circular manufacturing resulted to a significant change in organization performance while the ANOVA results showed that a good percentage of the change in organization performance was as a result of circular manufacturing. This conclusion was also based on the rejection of the third null hypothesis of the study.

The study concluded having tools to implement Circular manufacturing greatly improves organization performance. Cumulatively, Most of the respondents agreed that has implemented green or clean technology in their manufacturing process. They also agreed that energy sources used in their organization was environmentally clean. Most respondents noted that their organization had not adopted the use of internet of things in manufacturing process. They also noted that they had not adopted cloud manufacturing technology. The respondents also disagreed that they had adopted additive manufacturing by using 3D materials in all their manufacturing process.

Moderating Effect of policy framework

The study concluded that policy framework has a significant moderating effect on the relationship between circular manufacturing and organization performance of manufacturing firm in Kenya. This therefore led to the conclusion that the kind of policies that the government will implement will still have a significant influence on its organization performance.

Recommendations

Because of the positive and significant relationship between circular manufacturing and organization performance, the study recommends that all the Kenyan manufacturing firms should strive to adopt and consistently practice circular manufacturing in a bid to continuously improve their organization performance. Specifically, it recommends that manufacturing firms should prioritize the adoption of green or clean technologies in their manufacturing processes. This involves investing in energy-efficient equipment, renewable energy sources, and waste management systems. By minimizing energy and resource consumption, manufacturing firms can reduce their environmental impact and optimize production efficiency. Additionally, the integration of clean technologies can result in cost savings through reduced energy and raw material consumption.

Regulating and monitoring energy and water use in manufacturing operations is another crucial aspect of circular manufacturing. Manufacturing firms should establish robust monitoring systems to track energy and water consumption, identify areas for improvement, and implement measures to reduce waste. This can be achieved through the implementation of energy management systems and water recycling programs. By optimizing energy and water usage, manufacturing firms can enhance their sustainability performance and improve organization performance.

Exploring emerging technologies such as the internet of things (IoT) and cloud manufacturing can also contribute to circular manufacturing. The IoT enables real-time data collection and analysis, allowing manufacturers to optimize production processes, reduce waste, and enhance resource utilization. Cloud manufacturing, on the other hand, facilitates collaboration and resource sharing among manufacturing firms, leading to improved efficiency and reduced environmental impact. Manufacturing firms should explore the potential of these technologies and invest in their implementation to gain a competitive edge and enhance organization performance.

To drive the adoption of circular manufacturing, manufacturing firms should prioritize research and development efforts. This includes investing in the exploration of new materials, processes, and technologies that support circularity. Research and development activities can lead to the discovery of innovative solutions such as biodegradable materials, closed-loop recycling systems, and additive manufacturing techniques. By staying at the forefront of technological advancements, manufacturing firms can continuously improve their sustainability performance and respond to evolving market demands.

It is crucial for manufacturing firms to foster a culture of circularity among their employees. This can be achieved through comprehensive training and awareness programs. Employees should be educated about the principles and benefits of circular manufacturing, as well as provided with the necessary skills and knowledge to implement sustainable practices. Training programs can include workshops, seminars, and certifications that focus on sustainable manufacturing strategies, waste reduction techniques, and eco-design principles. By empowering employees with the tools and knowledge to embrace circular manufacturing, manufacturing firms can create a workforce that is committed to sustainability and actively contributes to organization performance.

References

[1]. Astrup W. K. (2015). Life Cycle Assessment Of Thermal Waste-To-Energy Technologies: Review And Recommendations. Journal Of Waste Management, 37, 104-115,

[2]. Chen, T. And K. Kockelman (2016). Carsharing's Life-Cycle Impacts On Energy Use And Greenhouse Gas Emissions. Transportation Research Part D: Journal Of Transport And Environment Management, 47, 276-284,

[3]. Daddi, T.; Nucci, B.; Iraldo, F. (2017). Using Life Cycle Assessment (Lca) To Measure The Environmental Benefits Of Industrial Symbiosis In An Industrial Cluster Of Smes. Journal Of Clean Production 147, 157–164.

[4]. Daú, G.; Scavarda, A.; Scavarda, L.F.; Portugal, V.J.T. (2019). The Healthcare Sustainable Supply Chain 4.0: The Circular Economy Transition Conceptual Framework With The Corporate Social Responsibility Mirror. Journal Of Sustainability, 11, 3259.

[5]. Dong, C.; Li, Q.; Shen, B.; Tong, X. (2019). Sustainability In Supply Chains With Behavioral Concerns. Journal Of Sustainability, 11, 4051.

[6]. Domenech, T.; Bleischwitz, R.; Doranova, A.; Panayotopoulos, D.; Roman, L. (2019). Mapping Industrial Symbiosis Development In Europe Typologies Of Networks, Characteristics, Performance And Contribution To The Circular Economy. Journal Of Resource Conservancy And Recycling 141, 76–98.

[7]. Domingues, A.R.; Lozano, R.; Ceulemans, K.; Ramos, T.B. (2017). Sustainability Reporting In Public Sector Organizations: Exploring The Relation Between The Reporting Process And Organizational Change Management For Sustainability. Journal Of Environment Management 6 (8), 292–301.

[8]. Dulebenets, M.A. A Diploid (2018). Evolutionary Algorithm For Sustainable Truck Scheduling At A Cross-Docking Facility. Journal Of Sustainability, 10, 1333.

[9]. Elmassah, S. (2018). Industrial Symbiosis Within Eco-Industrial Parks: Sustainable Development For Borg El-Arab In Egypt. Journal Of Business Strategy And Environment 27, 884–892.

[10]. Evans, S., D. Vladimirova, M. Holgado, K. Van Fossen, M. Yang, E. Silva, And C. Barlow (2017). Business Model Innovation For Sustainability: Towards A Unified Perspective For Creation Of Sustainable.

[11]. Geissdoerfer, M.; Morioka, S.M.; De Carvalho, M.M.; Evans, S. (2018). Business Models And Supply Chains For The Circular Economy. Journal Of Clean Production 190, 712–721.

[12]. Genovese, A., A. A. Acquaye, A. Figueroa, And S. L. Koh. (2017). Sustainable Supply Chain Management And The Transition Towards A Circular Economy: Evidence And Some Applications, Omega 66: 344–357.

[13]. Ghisellini, P.; Cialani, C.; Ulgiati, S. (2016). A Review On Circular Economy: The Expected Transition To A Balanced Interplay Of Environmental And Economic Systems. Journal Of Clean Production, 114, 11–32.

[14]. Gatune Julius, Ozor Nicholas & Oriama Ruth, (2020). Modelling Bio Economy Futures For Eastern Africa. Emerald Publishers.

[15]. Helfat, C.E.; Peteraf, M.A. (2018). The Dynamic Resource-Based View: Capability Lifecycles. Journal Of Strategic Management 3 (7), 997–1010.

[16]. Kirchherr, J., Reike, D., Hekkert, M. (2017). Conceptualizing The Circular Economy: An Analysis Of 114 Definitions. Journal Of Resources, Conservation And Recycling, 127, 221-232.

[17]. Meherishi, L.; Narayana, S.A.; Ranjani, K.S. (2019). Sustainable Packaging For Supply Chain Management In The Circular Economy: Journal Of Clean Production, 237, 117582.

[18]. Marcel W., Den_Hollander, Conny Khiwasa, Bakker P. & Hultinkw.E. (2017). Firm Size And Debt Maturity As Indirect Determinants Of Capital Structure. Journal Of Applied Economics, 25 (18), 1319-1322.

[19]. Minhat, M. & Dzolkarnaini, N. (2016). Is Executive Compensation A Substitute Governance Mechanism To Debt Financing And Leasing. Journal Of Applied Economics, 48 (14), 1293-1302.