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Critical success factors of Lean and Kaizen tools implementation in African agricultural organizations

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Abstract

This study aimed to investigate and describe the impact of critical success factors (CSFs) on lean and kaizen tools implementation in African agricultural organizations. A quantitative methodology was adopted, where a questionnaire has been distributed online among a sample of (300) top managers and leaders of the agricultural sector in different African countries. The collected responses were analyzed by SPSS 23 and the results showed the absence of CSFs for lean and kaizen implementation in African agricultural organizations, where there are deficiencies in the commitment of senior management and leadership to them, and a lack of employee involvement in the actual management operations, and there is little focus on cultural change and linking method to human resources. Moreover, the implementation of lean and kaizen management tools in the agricultural sector in Africa was low, and this is evidenced by misunderstanding of agricultural organizations in Africa about the nature of the philosophy of lean and kaizen to be utilized in order to improve productivity and eliminate waste and resource processes. Furthermore, the study's results indicated that there is a statistically significant positive impact of CSFs on lean and kaizen tools implementation in African agricultural organizations. The study proved that the organizational cultural factor having the strongest effect on lean and kaizen tools implementation in African agricultural organizations followed by financial factor, managerial factor, managerial factor, respectively and finally measurement and quality bias factor. Finally, the study concluded that great care must be taken in developing CSFs for lean implementation in Africa's agriculture sector, where in case the organization adopts inappropriate factors, it may hinder the achievement of the required performance. The researcher recommends



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the necessity of adopting Kaizen and Lean management strategies to develop the African agricultural market by top managers and leaders in the agricultural sector, with the need to follow the implementation guide in implementing the various tools and activities of continuous improvement and lean management, increasing employee satisfaction and changing the company's culture in line with the principles of agricultural companies and their goals.

Keywords: Critical Success Factors, Kaizen, Lean Management, Agricultural African Organizations.

1. Introduction

Africa is the first continent in the world in terms of the area of agricultural land, where the volume of arable land is more than 60% of the total land around the world and at the level of the continent, agricultural land constitutes about 35% of the total area of the continent. In terms of soil, the continent has different levels and qualities of Rich soil, as well as diverse agricultural seasons (Azzedine, 2016).

Despite the huge areas of agricultural land and the quality of agricultural land, Africa only achieves 25% of its agricultural consumption by 7% in the field of agriculture of all kinds of production, where 179 million hectares are cultivated with field crops and about 14 million hectares of tree crops, which is nothing but a little agricultural potential in Africa, due to many reasons, including the poor distribution of agricultural land



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and the inability of young people to easily obtain agricultural land areas, as well as the difficulty of obtaining the necessary financing for agricultural activity (FAO , 2000).

Although the agricultural activity in Africa is considered a promising activity because the agricultural sector is the backbone of the component of the economic and living life of the African peoples, the volume of spending on this sector is very poor compared to the size of spending on other sectors that do not constitute a major importance in Africa, such as agriculture (FAO., 2001).

It is worth noting that Africa is a young continent, as about 65 percent of Africa's population is under the age of 35, and that ten million young people join the workforce every year, which foretells that Africa must move forward towards developing work mechanisms that accommodate more young people. In 2015 the African Union issued a declaration to double food production and reduces poverty in half by 2025 (Azzedine, 2016).

It has been observed in recent years that the business environment has undergone major changes at the national and global levels. Globalization and technological improvements have been redefined in defining some factors of competitiveness, and bringing out new successful organizations (Savić et al., 2014).



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The improvement scenario for regulatory environments has intensified the demand for faster product development speed, manufacturing flexibility, waste disposal, better process control and efficient workforce utilization (Karim & Arif-Uz-Zaman, 2013). It is imperative to create leaner and more flexible organizational structures linked to a systematic approach closely linked to cost reduction through waste disposal this adaptation to new market strategies in various industrial sectors was provided by the so-called Lean Production System that arose from the Toyota Production System. In this production system, the management model is developed and becomes an efficient and competitive reference (Satolo et al., 2020).

Lean production system contains a philosophy that aims to identify sources of waste and reduce or gradually eliminate it based on five main principles: Defining (1) value from the point of view of customers and their needs, which defines (2) the value chain, which are the activities required to deliver the product to the customer lowest level of waste. The product is then manufactured using (3) continuous flow, which is triggered only when the customer fulfills the order. That is, using the logic (4) pull production. Based on these four principles and the use of continuous improvement (kaizen) or radical improvements (kaikaku), the fifth basic principle is reached, which is (v) the system of perfection (Calarge et al., 2012).



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As a result of regulatory laws governing agriculture, African agricultural organizations are finding it increasingly difficult to implement changes to their farming operations that would achieve significant cost reductions and improved efficiency in the agricultural organizations. This is the challenge facing farmers in Africa. Therefore, this research will focus on the study and analysis of critical success factors of Lean and Kaizen tools implementation in African agricultural organizations in order to confront the specific literature and identify opportunities to further developments for researches.

2. Research Problem and Questions

Change is a constant fact of life, and business being a part of everyday life is affected by the ever-changing dynamics in the business environment (Githuku, 2014). Thus, effective change management is a basic requirement in the survival or success of any organization in the present world. Japanese companies have come up with a different and unique tool to management change, and this has led to their companies like Toyota becoming very competitive in the global market, and they named this tool Kaizen which is derived from the Japanese words “Kai” and “zen” which means “change” and “good” respectively. Continuous improvement has also become an essential element in enabling different companies and businesses to compete and stay in global markets, which



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highlighted the term called “lean management” that focuses on stopping wasted activities, resources and processes, raising productivity and improving efficiency (Nguyen, 2019).

Kaizen and lean management has become global activities adopted by multinational companies and their employees. It has become popular not only in the manufacturing sector but also in the service sector, agriculture, commerce and others (Ohno et al., 2009). However, the prevalence of kaizen and lean management has reached its peak in developed countries, while in developing countries especially in Africa, it is still very small due to the limited number of players entering the practice, and given the limited resources of this country in terms of expertise, time, and funding (Otsuka, Jin & Sonobe, 2018).

One of the suggested reason that makes the application of Kaizen and Lean management in Africa a complex matter is that many global studies have been conducted on the reasons why industrial companies apply Kaizen and Lean management, and the benefits that can be obtained from these two tools, as well as Kaizen and lean management tools and techniques in the industry sector, however, to date, no systematic study has been conducted to determine the critical success factors of these tools, or the mechanisms for applying lean implementation and kaizen in agriculture sector, which is the largest and most prevalent sector in



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Africa compared to industry (Vermaak, 2008; Hailu et al., 2017; Kundu & Manohar, 2012).

Moreover, the regulatory laws governing agriculture in Africa are making African agricultural organizations increasingly difficult to implement changes in their agricultural operations that would achieve significant cost reductions and improved efficiency in agricultural organizations. This is the challenge facing farmers in Africa and inhibit them from implementing Kaizen or lean management (Calarge et al., 2012).

But looking at Africa and even the developed countries of the world, we find that studies such as (Lisiecka & Burka, 2016; Alhuraish et al., 2014; Borges Lopes et al., 2015; Hailu et al., 2017) have shown that despite the popularity and growth enjoyed by the Kaizen philosophy and lean management, most manufacturing industries are not successful and even the few successful manufacturing industries are counterproductive and suffer from many challenges in maintaining kaizen and lean management implementation and substantial improvements. This shows that Lean and Kaizen implementation is a complex process where critical success factors (CSFs) must be recognized (Alhuraish et al., 2014; Hailu et al., 2017).

It is important to develop an understanding of the critical factors for the successful implementation of lean and kaizen principles and practices.



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Identification of critical success factors (CSFs) will also encourage thinking in developing an appropriate implementation plan, therefore, the researcher believed that identifying critical success factors in implementing kaizen and lean management in the African agricultural sector would lead them to keep their agricultural activities thriving, and to compete globally and lead the agricultural supply chains in the country and in the world (Githuku, 2014; Hailu et al., 2017).

Therefore, the problem of this research is to investigate the impact of CSFs on lean and kaizen tools implementation in African agricultural organizations. The main problem of the study will be covered by answering the following study questions:

1. What is the impact of financial factor on lean and kaizen tools implementation in African agricultural organization?
2. What is the impact of organizational cultural factor on lean and kaizen tools implementation in African agricultural organization?
3. What is the impact of human resources factor on lean and kaizen tools implementation in African agricultural organization?
4. What is the impact of managerial factor on lean and kaizen tools implementation in African agricultural organization?



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5. What is the impact of measurement and quality bias factor on lean and kaizen tools implementation in African agricultural organization?

3. Literature review

Africa has seen many positive changes. The transportation cost has been drastically reduced thanks to the large investment in infrastructure that many developed countries and China support. Second, cell phones have proliferated across the continent, which has greatly reduced connection costs. As a result, farmers and traders now know the latest prices of agricultural products and other commodities in remote markets. Moreover, cell phones can be used to send and receive small amounts of money to cover goods and services transactions, including those that have not been affected before. Third, in many African countries, so-called structural adjustment programs (SAPs) have eliminated harmful government controls and regulations and privatized state-owned enterprises and parastatals. Although the SAP caused confusion at first, the positive effects of the reforms now seem to be being felt. Fourth, the regionally isolated markets have been integrated into the initiatives of the East African Community (consisting of 6 countries), the Southern African Development Community (15 countries), and the Economic Community of West African States (15 countries) (Sonobe, 2018).



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3.1 Techniques and kaizen tools of Lean Production Systems

The Lean Production System application in agricultural organizations uses different techniques and tools, which must be done in a coordinated and orderly manner (Pettersen, 2009).

Agricultural organizations, regardless of size or sector, embrace the philosophy of Lean and use techniques and tools in order to improve productivity and eliminate waste. These practices aim to improve production processes and eliminate times that do not add value to the product (Pakdil & Leonard, 2014).

Waste reduction or disposal (MUDA in Japanese) is categorized into seven types, namely: overproduction, waiting, transportation, movement, over-processing, rework and inventory. These technologies and tools assist in the process of reducing or eliminating waste by achieving results such as: reducing lead times, saving costs, improving quality and increasing productivity, making it more flexible and competitive (Sharma et al., 2015).

Lean / Kaizen tools have grown from its roots in industrialization to the service industry, public sectors and agricultural organizations. Lean thinking began with the Toyota Production System that transformed the automotive industry in post-war Japan, but is now used by companies and organizations around the world, in both the public and private



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sectors, to reduce waste, improve customer service, quality and efficiency, employee morale and communication and internal cooperation (Tanco et al., 2013).

Lean / Kaizen tools have proven its value in streamlining operations and improving efficiency in all types of industries and agricultural organizations. Several companies around the world are now implementing large-scale change programs at LEAN / KAIZEN with the aim of minimizing waste to reduce costs, improve systems and processes, and develop a culture of continuous improvement (Simons & Zokaei, 2005).

Lean / Kaizen tools in Farms helps agricultural organizations develop implement and maintain an obsessive focus on becoming efficient and productive in everything they do, be it farming, irrigation, cultural practices, harvesting, transportation, packaging, dispatch, etc. Lean farming focuses on every activity that occurs on the farm, thoroughly analyzing and improving processes and activities.

It provides a way to respond to growing needs to deliver more while consuming fewer resources (human, time, space, machines, materials, and facilities) using Lean / Kaizen principles. It uses cultural change to provide dramatically improved customer service and reduced costs. By involving people at the appropriate level, it develops a sense of ownership



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for the business. It also develops teamwork within departments, making agricultural organizations leaner (Sharma et al., 2015).

3.2 Benefits of Lean Kaizen Implementation in Farms

It has been proven that agricultural cost savings of up to 20% (direct and indirect) can be achieved by adopting and supporting LEAN farm practices! It goes without saying that these savings usually add directly to the bottom line, the financial gain comes from identifying, reducing and eliminating MUDA (waste) / activities that do not add value on the farm, leading to (Tanco et al., 2013):

- Higher workforce productivity (in the field and packing houses)
- Efficiency of packaging through improved planning and production planning and production flow
- Quality (reduce post-harvest damage)
- Inventory Management
- Optimum use and maintenance of agricultural equipment
- Yield improvement

Aside from the gains mentioned above, improved motivation, skills and teamwork are always noted by implementing LEAN Kaizen at Farms. These are invaluable in terms of money and lead to positive cultural change. RIB Consulting involves client teams in learning, applying, and analyzing and making LEAN / KAIZEN majors a regular part of the



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organization's operating philosophy. Our goal is to build your organization's core LEAN/KAIZEN competencies - from senior and middle managers to frontline workers - in a way that it becomes self-sufficient. We provide LEAN Kaizen application in farm implementation and training according to our model implementation model (Sonobe, 2018).

- Prepare – Training
- Plan – Assessment
- Retain- Audits & Daily LEAN Kaizen Management
- Implement – Continual Improvement workshops

3.3 Lean and Kaizen assistance in Africa

Kaizen has become a global activity spread by multinational corporations and their employees. It has become popular not only in the manufacturing sector but also in the service sector. However, the spread of kaizen in Africa is still very small due to the limited number of players entering the practice. Since individual companies cannot be a major force in the transfer of kaizen, the activities of the following four organizations are vital in transferring the kaizen method to Africa (GRIPS, 2009).

The manufacturing sector in sub-Saharan Africa is not generally dominant compared to the agriculture and services sectors. Kenya is no exception. In 2007, the contribution to the GDP of the manufacturing



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sector in Kenya was 11.8%, while the agriculture and service sectors accounted for 22.7% and 58.2% respectively (Fujimoto, 1999). Manufacturing activities in Kenya vary widely, as the country has been a popular investment destination in 1970s and 1980s in East Africa. There are some leading multinational companies operating in Kenya that bring in Kaizen methods including Toyota East Africa Ltd and GlaxoSmithKline Kenya Ltd (Clark et al., 2009).

Moreover, the Kenya Association of Manufacturers (KAM), which has around 600 members, is actively involved in organizing Seminars and training to raise the capabilities of its members. KAM has partnered with the Kaizen Institute in Mauritius since 2005 and has been inviting experts to attend seminars and consultations. These costs are now partially covered by the African Management Services firm whose original sponsor is the International Finance Corporation (IFC). KAM and Kaizen Institute set up an annual award in kaizen in 2008. Due to the growing demand for kaizen training; Kaizen Institute offers its own regular training courses in Nairobi. Because of the publicity gained through the press articles provided by KAM, Kaizen is relatively well recognized in Kenya, and now there are some private local consultants who can provide Kaizen services. As for public initiatives, the Productivity Center of Kenya (PCK), which has been receiving assistance from APO and JPC since 2006, has organized seminars and provided consultations for three



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model manufacturing companies, as well as 4 government and service organizations (Sonobe, 2018)

The PCK, currently under the Ministry of Labor, has only 5 employees. Its activities have received good attention from the government, and there is a plan to legally expand the powers and capabilities of the PCK during the 2009/10 fiscal year. Although there are some Kaizen activities in Kenya, there are some challenges. First, the beneficiaries of KAIZEN's activities at KAM have so far been confined to relatively well-established enterprises, and the majority of manufacturers are still unaware of the actual methodology. Second, the PCK mandate is not focused on the manufacturing sector. Therefore, the diffusion of the Kaizen activities of the manufacturers through the PCK channel may be slow. However, the Ministry of Manufacturing and its agencies, which are the main public institutions for the manufacturing sector, are still aware of the Kaizen methodology and cannot direct local manufacturers (GRIPS, 2009).

The contribution of the manufacturing sector to the GDP is lower in Ethiopia. In 2006/07 it was only 5.1%, compared to 46.3% from the agricultural sector and 40.3% from the service sector (Central Statistical Agency, 2007). In comparison with Kenya, the presence of multinational corporations is very small in Ethiopia. However, at the same time, some talented local entrepreneurs enjoyed the benefits of accessing a market of nearly 80 million people. Due to the lack of major multinational



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corporations, Ethiopia has yet to absorb Kaizen's knowledge. One of the characteristics of the Ethiopian manufacturing industry is the dominance of public enterprises. 44% of the value added from the manufacturing sector was generated by 154 public institutions in 7.22/2006. The government of Ethiopia is committed to modernizing and improving productivity in its public enterprises (GRIPS, 2009). The Privatization and Supervision of Public Enterprises Agency (PPESA), a division of the Ministry of Trade and Industry, is responsible for implementing Business Process Reengineering (BPR) among public manufacturers. The Business Restructuring Program (BPR) introduces benchmarking practices and intends to review needs for restructuring organizational tasks and activities. Although kaizen is not adopted as a method for improving productivity by PPESA, it is considered that BPR and kaizen are complementary because business reengineering is a necessary tool for innovation or radical transformation, while kaizen is necessary to achieve the incremental and sustainable improvement of daily operations (GRIPS, 2009).

The Kaizen approach is a step-by-step process that urges every worker to think about their work environment and suggest improvements. Therefore, it does not require a lot of financial investment but only strong motivation for workers. The critical success factors for implementing the importance of applying the Kaizen approach first are



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to eliminate waste in operations as much as possible, thus improving the time, cost and quality of the process. Second, in improving the social aspect by changing the culture of employees and the institution through learning, considering that learning is an essential part of the Kaizen philosophy, and this is that the individual learns how to define his goals and reach them on his own. Third, Kaizen helps create a leadership environment that is responsive to results and wants to make change regardless of the effort. Fourth, public sector organizations lack the taste of teamwork, and thus Kaizen helps make this spirit work for all individuals (Otsuka, Jin, Sonobe, & Kayashima, 2018).

3.4 Lean and Kaizen tools implementation in African agricultural organizations

Agribusiness was created, according to Zylberstajn (2013), to designate the inseparable link between agricultural production activity and industrial activity, whether its inputs are directed, either to the processing of the production they generate (Zylberstajn, 2013).

Studies based on the application of lean production techniques and tools can be found in authors such as (Walter, 2013), Marodin & Saurin (2013), (Vamsi Krishna Jasti, 2014) and (Savić et al., 2014). It is noted, however, that the agribusiness sector, despite its great importance to the global



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economy, has not been explored much by researchers when it relates to lean production (Otsuka, Jin, Sonobe, & Kayashima, 2018).

Gunderson et al. (2014) adds that for the effective and efficient operation of agribusiness firms, it requires an understanding and evaluation of, for example, costing and component costing, workforce and product flow scheduling, logistics, inventory management, sales and CRM, workforce selection and management And access to capital and financial management (Gunderson et al., 2014).

In Africa, Botswana started introducing Kaizen in the early 1990s, and more recently it has been followed by Egypt, Tunisia, Ethiopia, Zambia, Tanzania, Ghana, Kenya, Cameroon, Senegal, Sudan, and the Republic of the Congo. Nevertheless, the majority of business owners, managers and workers in Africa are still familiar with Kaizen (GRIPS, 2009). As past experiences of kaizen diffusion efforts indicate, an important task for African country governments is to raise awareness by providing free training programs to business communities and establishing model factories. It is also important to train the trainers who assist the managers and engineers of those companies that want to learn about kaizen. Initially, the concept began to spread from one product line and product to other lines and products within the company. Those pioneering companies that seriously put Kaizen into action will see



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increasingly substantial improvements in quality and productivity, and this will urge their suppliers and customers to do the same. Thus, kaizen will spread from a few companies to many companies within one industry and from one industry to another (Otsuka, Jin, Sonobe, & Kayashima, 2018)

During the early stage of deployment, there will be a knowledge asymmetry between the metropolitan area and less developed regions, and between large and small firms. In order to spread kaizen more commonly, governments and business associations can contribute by increasing awareness through competitions, awards, and media campaigns. Such public support during the publishing process is very important, as is the commitment of political leaders. Nevertheless, in the early stage of publication, political leaders or government officials were not sufficiently aware of the philosophy that they should promote throughout the country (GRIPS, 2009). The best way to give politicians and bureaucrats an understanding and appreciation of the nature and values of Kaizen is to start by introducing them to their offices. Nonetheless, once the public understands the value of this approach, the role of government shifts to a role in building institutions for quality control, to prevent inferior Kaizen-related consulting or training services. Therefore, through appropriate government policies, Africa will likely succeed in deploying Kaizen and continuously improving quality and



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productivity. Moreover, Japan is ready to help spread it in Africa as it has successfully done in other developing countries. Before discussing this issue further, it seems helpful to sketch out how Kaizen can improve quality and productivity (Otsuka, Jin, Sonobe, & Kayashima, 2018).

As Kaizen's premier activity, it will encourage workers to classify processes and equipment in the company into those that are truly needed and those that are not. After classifying everything, workers will then discuss ways in which they can get rid of those they have identified as unnecessary. From this analysis, for example, a broken machine that has occupied the center of a workshop for years will be removed. Since removing it will make the workflow smoother, workers will feel better, thus a small improvement is achieved. Workers can also classify their own activities into those that add value to customers, those that do not add any value but are indispensable, and those that can be considered meaningless. By giving up valuable activities, it may improve productivity. Since the workers have achieved this improvement without new methods or new mechanism being imposed on them by the top management, they can feel ownership of the process. Top management is also happy because productivity has improved without any major cash investment (Otsuka, Jin, Sonobe, & Kayashima, 2018).



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4. Methodology

4.1 Research Design and Tool

In this study, the research problem focuses on revealing the impact of CSFs on lean and kaizen tools implementation in African agricultural organizations. The quantitative approach is considered as the most appropriate utilized approach to cover the research problem in a clearer way. This approach essentially integrates data, analyses and uses them to examine the connection between variables (Rawbone, 2015). The main objective of this method is to define the possible association between two or more variables (Leedy & Ormrod, 2005), as is the case in this research. Apuke (2017) outlined the benefits of quantitative research design as its importance, as the data collected could not be obtained using other techniques. It also has an objective representation of the target population and a structured assessment, as all participants share the same data.

The questionnaire was the instrument utilized in this study for the collection of primary data through conducting a cross sectional survey. Owens (2002) pointed to the advantages of the survey such as its consistency, as the data gathered is not available from other sources, the unbiased representation of the population of interest and the standardization of the measurement, since the same data is collected from every participant. The questionnaire was designed based on previous relevant studies and literature and consisted of three different parts with a



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set of closed statements directed towards collecting data on the different study variables.

The first part of the questionnaire consists of questions covering the sociodemographic information of the selected sample participating in this study including participants' gender, residential region, job position, qualifications and years of experience. The second part consists of five sections that inquire about five different critical success factor for lean and kaizen implementation in African agricultural organizations, where the first section includes a group of (5) statements asking about the first independent CSF in the study which is the financial factor, while the second section inquiries about the second independent CSF which is the organizational cultural factor represented by another (5) close-ended statements. Moreover, the third section includes a group of (5) statements asking about the third independent CSF which is the human resource factor, while the fourth section inquiries about the fourth independent CSF which is the managerial factor represented by another (5) close-ended statements and the last fifth section consisted from (5) statements asking about the fifth independent CSF which is the measurement and quality bias factor.

The last third part of the questionnaire was asking about the degree of lean and kaizen tools implementation in African organizations, where (8) closed- ended statements was directed in this part to the study sample.



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The fifth Likert Scale was utilized to gather the responses of the study sample.

One of the fundamental matters that was also taken into account in designing the questionnaire is verifying its reliability and validity, in order to obtain reliable and precise results. The validity of the questionnaire was achieved as long as its statements were taken from questionnaires published in peer-reviewed and reliable previous studies and papers. However, for the reliability of the questionnaire, it was verified by conducting a pilot study on a sample of (30) top managers and leaders who have two or more years of practical experience in the agricultural sector in different African countries. The reliability of the tool and its components was determined by SPSS' Alpha Cronbach test before distributing the tool to the original study sample members and conducting the real study. Table 1 below shows the Cronbach alpha values for the overall questionnaire and its different parts.

Table 1: The results of Cronbach' alpha reliability test

No.	Variable	Number of Items	Cronbach's alpha value
1	Financial factor	5	0.831
2	Organizational cultural factor	5	0.805
3	Human resources factor	5	0.876
4	Managerial factor	5	0.801
5	Measurement and Quality Bias factor	5	0.829
6	Lean and Kaizen tools implementation	8	0.913
Overall Tool's Items		33	0.863



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As shown in Table 1, Cronbach's alpha was determined to be (0.831) for elements of the first scale, (0.805) for elements of the second scale, (0.876) for elements of the third scale, (0.801) for elements of the fourth scale, (0.829) for elements of the fifth scale and (0.913) for elements of the sixth scale. Moreover, it was (0.863) for the overall instrument elements, which means that the reliability of the tool is acceptable, and that the results that will be obtained from this questionnaire are valid and will be the same if the questionnaire is redistributed to another random sample, as long as Cronbach's Alpha value is higher than (0.7) (Graham, 2006).

4.2 Research Sample

The study population in the current study consisted from all top managers and leaders who have two or more years of practical experience in the agricultural sector in different African countries. Due to the impossibility of covering the entire study population, in terms of cost and time-consuming, a random representative sample of the study population consisting of (300) top managers and leaders of the agricultural sector in different African countries was selected, and the questionnaire was sent to them electronically via e-mail.



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The following Table 2 shows the socio-demographic description of the members of the study sample according to (gender, residential region, job position, qualifications and years of experience):

Table 2: The socio-demographic characteristics of the study sample

Variable	Categories	Frequency	Percentages
Gender	Male	166	55.3%
	Female	134	44.7%
Residential region	Eastern Africa	50	16.7%
	Middle Africa	70	23.3%
	Northern Africa	59	19.7%
	Southern Africa	61	20.3%
	Western Africa	60	20.0%
Job Position	Development of agricultural programs and projects	55	18.3%
	Food security and agriculture production	78	26.0%
	Planning, services and management development	88	29.3%
	Agricultural economics and marketing	79	26.3%
Qualifications	Bachelor's degree	177	59.0%
	Master's degree	89	29.7%
	PhD	34	11.3%
Years of Experience	Less than 3 years	77	25.7%
	3 years - 10 years	120	40.0%
	10 years - 20 years	60	20.0%
	More than 20 years	43	14.3%
Overall		300	100%



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The descriptive statistics of the socio-demographic data of the study sample shows that the study participants were divided almost evenly between males (55.3%) and females (44.7%). The sample of top managers and leaders who participated in this study were from different regions of Africa, and the proportion was (16.7%) from eastern Africa, (23.3%) from middle Africa, (19.7%) from northern Africa, (20.3%) from southern Africa and (20.0%) from western Africa, and this indicates the researcher's keenness that the study should be comprehensive for all regions of Africa and reflect the real status of agriculture sector to the greatest possible degree. Moreover, the researcher was keen to take into account the viewpoints of top managers and leaders who work in the various departments of the agricultural sector in Africa in a way that enables him to obtain logical answers that are close to the truth, given that they are taken from specialists. The percentage of those working in the development of agricultural programs and projects was (18.3%), (26%) of them working in food security and agriculture production, (29.3%) working in planning, services and management development and (26.3%) working in agricultural economics and marketing.

Most of the study sample members were well educated having Bachelor's degree at least (59%), Master's degree with a ratio of (29.7%) or Doctoral degree with a ration of (11.3%). According to years of experience, Table 2 shows that individuals with less than 3 years of experience are few,



representing only (25.7%) of the sample. On the other hand, the vast majority of the study sample possesses more than 3 years of experience with a percentage of (74.3%); including (40.0%) with 3-10 years of experience, (20.0%) with 10-20 years of experience, and (14.3%) with more than 20 years which indicates that the study sample is composed from highly qualified managers and decision makers who have knowledge in the field of the study, and this shows their ability to answer the research questions with credibility and high efficiency.

The researcher utilized SPSS (23) software program to analyze the primary collected data from the questionnaires, and then presenting the results and conclusions raised from this study. Different statistical descriptive tests were performed including frequencies, percentages, means and standard deviations to summarize variables of interest. Moreover, the simple linear regression and Pearson correlation tests were used to examine the impact of CSFs on lean and kaizen tools implementation in African agricultural organizations at significance level 5%, which is the main problem of this study.

5. Results and Discussion

In this part, the data of the questionnaires that were collected from a sample of decision makers, top managers and leaders of the agricultural sector in different African countries were analyzed, using means and



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standard deviations to obtain the level and ranks of the items related to the study, as well as the Pearson correlation and simple linear regression test to predict the relationship between the presence of CSFs and the success of lean and kaizen tools implementation in African agricultural organizations.

5.1 Results related to the CSFs for Lean and Kaizen Implementation in African Agricultural Organizations

In order to evaluate the state of the CSFs for lean and kaizen implementation in African agricultural organizations from the perspective of top managers and leaders of the agricultural sector in Africa, the descriptive statistics (means and standard deviation) of the responses and their ranks, which were elicited using a five-point Likert scale were calculated via SPSS, where means ranging from (1-1.80) were considered very low, from (1.81 to 2.60) were considered low, from (2.61-3.40) were considered moderate, from (3.41-4.20) were considered high and from (4.21-5.00) were considered very high. Table 3 below shows the descriptive summary of the responses to the questionnaire's items used to measure the CSFs for lean and kaizen implementation in African agricultural organizations.

Table 3: Summary of participants' responses to items measuring the CSFs for lean and kaizen implementation in African agricultural organizations (N=300)



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Statement	Mean	Std. Deviation	Rank	Level
1. The need to minimize costs represents a focal point in implementing kaizen and lean management.	1.98	0.97	17	Low
2. Focus on minimizing waste in the processes is a crucial that determines the success of Kaizen implementation.	1.87	0.83	25	Low
3. The introduction of close, long-term cooperation and partnership in relations with suppliers is a financial necessity.	2.07	1.02	7	Low
4. Productivity improvement initiative like lean would require financial resources to hire consultants.	1.95	0.86	20	Low
5. Providing adequate resources and funding is important for implementing kaizen and lean management.	1.96	0.93	19	Low
Financial factor	1.97	0.91	Low	
6. The cultural desire to change the philosophy of the organization (targeting at the elimination of waste).	1.88	0.83	24	Low
7. The introduction of transparency within the organization.	2.01	0.99	14	Low



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8. Developing formal mechanisms to encourage and enable autonomy.	1.92	0.87	23	Low
9. Change and "flattening" of the organizational structure (from the most frequently used formal structure on the process one).	2.00	0.93	15	Low
10. The introduction of competitions and awards system, motivating employees (promoting improvements and innovation proposals).	2.02	0.95	11	Low
Organizational cultural factor	1.97	0.89		Low
11. Employee discipline in implementing new solutions.	2.05	1.00	9	Low
12. Involvement of employees in decision-making and finding solutions to problems.	2.07	0.98	6	Low
13. Teamwork spirit and cooperation between employees to achieve the goals, mission and vision of the organization.	1.99	0.92	16	Low
14. Staff development - improving their competencies, through training and continuous learning.	1.95	0.88	21	Low
15. Establish a mechanism for capturing feedback from employees to senior management and keeping	1.97	0.96	18	Low



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communication channels open between them to improve the process.

Human resources factor	2.01	0.93		Low
16.Management commitment to the process improvement.	1.93	0.85	22	Low
17.Changing the managers work orientation from overseeing to the continuous improvement process.	2.02	0.99	12	Low
18.Demonstrate active leadership style by acting as role models to exemplify the desired behavior for lean and kaizen implementation.	2.07	0.96	5	Low
19.Changing the mentality of managers (from the "governance" to the partnership and constructive workers support).	2.06	1.01	8	Low
20.The elimination of the so-called "Management from beyond the desk".	2.16	1.04	1	Low
Managerial factor	2.04	0.93		Low
21.Selection of key elements affecting the quality of agriculture in order to seek ways to improve it.	2.08	0.99	4	Low



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22.Determining performance criteria and how best to measure and develop the performance of agricultural workers.	2.02	1.11	13	Low
23.Establish measurement system for agriculture activities, and information technology infrastructure.	2.03	0.98	10	Low
24.Monitoring and continuous evaluation for farmers and agriculture employees' performance.	2.12	1.04	2	Low
25.Management of agriculture process quality and operational results.	2.09	1.05	3	Low
Measurement and Quality Bias factor	2.07	1.01		Low
Overall	2.01	0.93		Low

It is clear from Table (3) above that the arithmetic means that measure the state of the CSFs for lean and kaizen implementation in African agricultural organizations were low and ranged from (1.87-2.16). It can be noticed that item (20) from managerial factor category, which states that "The elimination of the so-called "Management from beyond the desk", represents the highest agreed mean statement (2.16) and was followed secondly by item (24) from measurement and quality bias factor category, in which it stated that "Monitoring and continuous evaluation for farmers and agriculture employees' performance" with a mean (2.12), followed thirdly by item (25) also from measurement and quality bias



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factor category, in which it stated that "Management of agriculture process quality and operational results" with a mean (2.09), followed fourthly by item (18) from managerial category factory, in which it stated that "Demonstrate active leadership style by acting as role models to exemplify the desired behavior for lean and kaizen implementation" with a mean (2.08), followed by item (21) fifthly, from measurement and quality bias factor category, in which it stated that "Selection of key elements affecting the quality of agriculture in order to seek ways to improve it." with a mean (2.07) and followed by item (12) sixthly, from human resources factor category, in which it stated that "Involvement of employees in decision-making and finding solutions to problems" with a mean (2.07).

However, items of organizational culture and financial factor have the least means among the rest of statements, where item (2) from financial factor category stated that "Focus on minimizing waste in the processes is a crucial that determines the success of Kaizen implementation" and item (6) from organizational culture category stated that "The cultural desire to change the philosophy of the organization (targeting at the elimination of waste)." have the lowest means of (1.87) and (1.88) respectively, with the lowest agreement from the sample members regarding its content.

Regarding the arrangement of CSFs for lean and kaizen implementation in terms of their availability in African agricultural organizations



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according to the study sample perspective, the measurement and quality bias factor comes first with an arithmetic average of (2.07), followed by managerial factor secondly with a mean of (2.04), thirdly human resources factor with a mean (2.01), fourthly financial factor with a mean of (1.98) and finally in the last place was organizational culture with the lowest mean of (1.97).

Furthermore, the overall mean for this axis was (2.01) which shows that most of the study sample are not agreed with the items of this part of study showing that there is a weak to no existence of CSFs for lean and kaizen implementation in African agricultural organizations, where there are deficiencies in the commitment of senior management and leadership to them, and a lack of employee involvement in the actual management operations, and there is little focus on cultural change and linking method to human resources.

The results of this study agree with the study of (Azzedine, 2016; Otsuka, Jin & Sonobe, 2018) which showed that despite the vast areas of agricultural land and the quality of agricultural land in Africa, and although agricultural activity in Africa is considered a promising activity because the agricultural sector is the backbone of the component of the economic and living life of African peoples, but that the contribution of this sector to the GDP and the improvement of the country's economy is limited. The reason can be attributed to the absence of effective



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management of this sector, and the absence of success factors for effective management using Kaizen tools and lean management. The study of (Vermaak, 2008; Hailu et al., 2017; Kundu & Manohar, 2012) showed that Africa is one of the countries that has recently started to include modern management tools (Kaizen and Lean) in its industrial sector, but the agricultural sector still suffers from randomness, lack of organization and the absence of continuous development, the search for efficiency and the reduction of wasted money, as a result of the absence of success factors for the application of modern management tools. These factors include financial, cultural, human and administrative resources, and many others.

5.2 Results related to Lean and Kaizen Tools Implementation in African Agricultural Organizations

In order to assess the degree of Lean and Kaizen tools implementation in African agricultural organizations from the perspective of top managers and leaders of the agricultural sector in Africa, a set of questions were asked and in the same manner Likert scale of five points was used in arranging the respondents' answers. The results of the descriptive analysis were as shown in Table 4:

Table 4: Summary of participants' responses to items measuring the degree of Lean and Kaizen tools implementation in African agricultural organizations (N=300)



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Statement	Mean	Std. Deviation	Rank	Level
1. Agricultural organizations embrace the philosophy of lean and kaizen in order to improve productivity and eliminate waste processes and resources.	2.15	1.06	2	Low
2. Agriculture organizations aims to reduce times, save costs, improve quality and improve processes and activities.	2.05	0.95	5	Low
3. Agriculture organizations seeks to develop a culture of continuous improvement and processes evaluation.	2.14	1.06	3	Low
4. Organizations have an obsessive focus on becoming efficient and productive in everything they do including farming, irrigation, cultural practices, harvesting, transportation, packaging, dispatch, etc.	2.17	1.10	1	Low
5. Agricultural organizations are keen to create a spirit of team working and cooperation between employees and even managers.	1.93	0.88	8	Low
6. Agricultural companies are keen to involve their employees in making	2.04	0.99	6	Low



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decisions in a way that makes them coherent and integrated.				
7. Agricultural organizations have the autonomy to expand and develop their mission and vision.	2.02	0.87	7	Low
8. Agribusiness managers have a sense of leadership and are keen to run the business from the field rather than from behind the desks.	2.07	0.96	4	
Overall	2.07	0.95		Low

It is clear from Table 4 above that the arithmetic means that measure degree of Lean and Kaizen tools implementation in African agricultural organizations were low ranged from (1.93- 2.17). It can be noticed that item (4) which stated: "Organizations have an obsessive focus on becoming efficient and productive in everything they do including farming, irrigation, cultural practices, harvesting, transportation, packaging, dispatch, etc.", represents the highest agreed mean statement (2.17) and was followed secondly by item (1) in which it stated: "Agricultural organizations embrace the philosophy of lean and kaizen in order to improve productivity and eliminate waste processes and resources" with a mean (2.15), followed thirdly by item (3) which it stated that: "Agriculture organizations seeks to develop a culture of



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continuous improvement and processes evaluation" with a mean (2.14) and finally with the least mean value, item (5) which stated that: "Agricultural organizations are keen to create a spirit of team working and cooperation between employees and even managers" with a low mean (1.93).

Furthermore, the overall mean for this axis was (2.07) which indicates that the study sample members' evaluation of the degree of Lean and Kaizen tools implementation in African agricultural organizations was low, as the agricultural organizations in Africa do not know what is the nature of the philosophy of lean and kaizen to be utilized in order to improve productivity and eliminate waste and resource processes. African organizations also rarely seeks to reduce time, save costs, improve quality and improve operations and activities, and there is a neglect from them in involving their employees in decision-making in a way that makes them coherent and integrated and they detract from everything that makes it applicable to Kaizen and Lean tools. This is what was shown by the study of (Vermaak, 2008; Hailu et al., 2017; Kundu & Manohar, 2012) which showed that no systematic study was conducted to determine the critical success factors for these tools, or the mechanisms of applying lean and kaizen application in the agricultural sector, which is the largest and most widespread sector in Africa compared to industry, which justifies the low application of these tools in Africa.



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5.3 The Impact of CSFs on Lean and Kaizen Tools Implementation in African Agricultural Organizations

In order to estimate the impact of CSFs on lean and kaizen tools implementation in African agricultural organizations, Pearson correlation and simple linear regression analyses were implemented utilizing SPSS and the results were as indicated in the following Table (5) below:

Table 5: Linear regression's model summary for the impact of CSFs on lean and kaizen tools implementation in African agricultural

organizations (N=300)							
Model No.	DV	IV	(β) coefficient	R	R ²	F	Sig.
1.	Lean and Kaizen tools implementation	Financial factor	1.027	0.976*	0.952	5927.4*	0.000
2.	Lean and Kaizen tools implementation	Organizational cultural factor	1.049	0.981*	0.962	7455.1*	0.000
3.	Lean and Kaizen tools implementation	Human resources factor	1.009	0.988*	0.976	12201.1*	0.000
4.	Lean and Kaizen tools implementation	Managerial factor	1.015	0.993*	0.987	22208.1*	0.000
5.	Lean and Kaizen tools implementation	Measurement and Quality Bias factor	0.940	0.991*	0.983	16942.9*	0.000

*Significant at 0.05



For the first model, the dependent variable (Lean and Kaizen tools implementation) was regressed on the independent variable (Financial factor) and as shown in Table 5, the model summary and overall fit statistics indicates that there is a statistically significant impact of financial factor on Lean and Kaizen tools implementation in African agricultural organizations, where the coefficient of determination R^2 amounted to (0.952) at ($\alpha \leq 0.05$), which means that (95.2%) of the increment in the degree of lean and kaizen tools implementation in Africa is because of the financial success factor. Moreover, the degree of impact (β) for the financial factor on lean and kaizen tools implementation is (1.027). This means that a one-step increase in the financial factor lead to an increment in the kaizen and lean tools implementation by (1.027).

Secondly, the dependent variable (Lean and Kaizen tools implementation) was regressed on the independent variable (organizational cultural factor) and as shown in Table 5, the model summary and overall fit statistics indicates that there is a statistically significant impact of organizational culture factor on Lean and Kaizen tools implementation in African agricultural organizations, where the coefficient of determination R^2 amounted to (0.962) at ($\alpha \leq 0.05$), which means that (96.2%) of the increment in the degree of lean and kaizen tools implementation in Africa is because of the organizational cultural success factor. Moreover, the degree of impact (β) for the organizational cultural factor on lean and



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kaizen tools implementation is (1.049). This means that a one-step increase in the organizational cultural factor lead to an increment in the kaizen and lean tools implementation by (1.049).

Thirdly, the dependent variable (Lean and Kaizen tools implementation) was regressed on the independent variable (human resources factor) and as shown in Table 5, the model summary and overall fit statistics indicates that there is a statistically significant impact of human resources factor on Lean and Kaizen tools implementation in African agricultural organizations, where the coefficient of determination R^2 amounted to (0.976) at ($\alpha \leq 0.05$), which means that (97.6%) of the increment in the degree of lean and kaizen tools implementation in Africa is because of the human resources success factor. Moreover, the degree of impact (β) for the human resources factor on lean and kaizen tools implementation is (1.009). This means that a one-step increase in the human resources factor lead to an increment in the kaizen and lean tools implementation by (1.009).

Fourthly, the dependent variable (Lean and Kaizen tools implementation) was regressed on the independent variable (managerial factor) and as shown in Table 5, the model summary and overall fit statistics indicates that there is a statistically significant impact of managerial factor on Lean and Kaizen tools implementation in African agricultural organizations, where the coefficient of determination R^2 amounted to (0.987) at ($\alpha \leq$



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0.05), which means that (98.7%) of the increment in the degree of lean and kaizen tools implementation in Africa is because of the managerial success factor. Moreover, the degree of impact (β) for the managerial factor on lean and kaizen tools implementation is (1.015). This means that a one-step increase in the financial factor lead to an increment in the kaizen and lean tools implementation by (1.015).

Finally, the dependent variable (Lean and Kaizen tools implementation) was regressed on the independent variable (measurement and quality bias factor) and as shown in Table 5, the model summary and overall fit statistics indicates that there is a statistically significant impact of measurement and quality bias factor on Lean and Kaizen tools implementation in African agricultural organizations, where the coefficient of determination R^2 amounted to (0.983) at ($\alpha \leq 0.05$), which means that (98.3%) of the increment in the degree of lean and kaizen tools implementation in Africa is because of the measurement and quality bias factor. Moreover, the degree of impact (β) for the measurement and quality bias factor on lean and kaizen tools implementation is (0.940). This means that a one-step increase in the measurement and quality bias factor lead to an increment in the kaizen and lean tools implementation by (0.94).

Based on the foregoing, it can be said that organizational cultural factor is the most affected factor from CSFs on the lean and kaizen tools



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implementation in African agricultural organizations ($\beta= 1.049$), followed by financial factor ($\beta= 1.027$), followed by managerial factor ($\beta= 1.015$), followed by human resources factor ($\beta= 1.009$) and lastly up to measurement and quality bias factor ($\beta=0.940$).

Hence, this proved the impact of CSFs on lean and kaizen tools implementation in African agricultural organizations, which is affirmed by several previous studies but in different sectors rather than agriculture sector, such as Hailu et al. (2017) which showed the impact of critical success factors for sustainable Kaizen implementation in manufacturing industry in Ethiopia, where they clarified that comprehensive training for employees, ownership, teamwork, employees' attitude, effective communication, effective leadership, process control and continual evaluation are all necessary factors that are important for implementing lean and kaizen management tools effectively. Moreover, the results are in line with the study of Kundu and Manohar (2012), which showed the importance of the following critical success factors within IT service companies for implementing lean or kaizen including management involvement and commitment; communication; link quality improvement to employee; culture change; education and training; link quality improvement to customer; continuous improvement, financial capability; organization infrastructure; vision and plan as well as IT and innovation.



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6. Conclusion and Recommendations

Kaizen and lean management has become global activities adopted by multinational companies and their employees. It has become popular not only in the manufacturing sector but also in the service sector, agriculture, commerce and others. However, the prevalence of kaizen and lean management has reached its peak in developed countries, while in developing countries especially in Africa, it is still very small due to the limited number of players entering the practice, and given the limited resources of this country in terms of expertise, time, and funding. Accordingly, this research aimed to investigate the impact of CSFs on lean and kaizen tools implementation in African agricultural organizations.

The study showed the absence of CSFs for lean and kaizen implementation in African agricultural organizations, where there are deficiencies in the commitment of senior management and leadership to them, and a lack of employee involvement in the actual management operations, and there is little focus on cultural change and linking method to human resources.

Moreover, the implementation of lean and kaizen management tools in the agricultural sector in Africa was low, and this is evidenced by misunderstanding of agricultural organizations in Africa about the



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nature of the philosophy of lean and kaizen to be utilized in order to improve productivity and eliminate waste and resource processes. African organizations also rarely seeks to reduce time, save costs, improve quality and improve operations and activities, and there is a neglect from them in involving their employees in decision-making in a way that makes them coherent and integrated and they detract from everything that makes it applicable to Kaizen and Lean tools

Furthermore, the study concluded that there is a statistically significant positive impact of CSFs on lean and kaizen tools implementation in African agricultural organizations. The study proved that the organizational cultural factor having the strongest effect on lean and kaizen tools implementation in African agricultural organizations followed by financial factor, managerial factor, managerial factor, respectively and finally measurement and quality bias factor.

It was also concluded that successful lean and kaizen implementation is subject to and facilitates certain critical factors. A thorough understanding of these critical factors will benefit organizations wishing to implement lean and kaizen principles. Great care must be taken in developing critical success factors for lean implementation in Africa's agriculture sector, where in case the organization adopts inappropriate factors, it may hinder the achievement of the required performance.



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To date, critical success factors for implementing lean principles in the African agriculture sector have not been systematically examined and investigated. Most of the current studies have derived their set of critical success factors from a manufacturing perspective. Thus, it is not actually designed to meet the needs of the agriculture sector. This study suggested a set of critical success factors that are believed to be most suitable for the African agricultural sector. It has improved in the initial studies by incorporating insights drawn from lean and kaizen implementation in manufacturing and other service sectors. It also considered critical success factors for other process improvement initiatives in the agriculture sector.

Based on the results, the study recommended the necessity of adopting Kaizen and Lean management strategies to develop the African agricultural market by top managers and leaders in the agricultural sector, with the need to follow the implementation guide in implementing the various tools and activities of continuous improvement and lean management, increasing employee satisfaction and changing the company's culture in line with the principles of agricultural companies and their goals.

Essentially, this study can be used as a basis for further experimental research. In the future, the authors also recommend conducting a larger survey by engaging a group of academics, consultants and practitioners



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to further investigate and validate critical success factors, and also recommend a comparative analysis of organizational success and performance among organizations from all sectors (agricultural, industrial, service, technological, etc.) to enhance our understanding of how to successfully implement kaizen and lean management across various sectors.

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