

The Role of Risk Management in Improving Customs Revenue:

A Case Study of Suba dry Port in Sudan (2014-2019)

دور إدارة المخاطر في تحسين الإيرادات الجمركية:

دراسة حالة ميناء سوبا الجاف في السودان (2014-2019)

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Abstract

Customs revenue is an essential source of income for governments worldwide. Effective risk management plays a significant role in improving customs revenue collection. This research aimed to investigate the impact of risk management on customs revenue in the context of a Suba dry port. A quantitative research approach was adopted, utilizing a sample of customs revenue data from the Sudan Customs Authority's reports. The study employed a paired sample t-test to analyze the data. The findings showed that implementing risk management practices led to a significant increase in customs revenue collection. The results of the study suggest that effective risk management is crucial in improving customs revenue collection and can be implemented in other ports to enhance their financial performance.

Keywords: Risk management, Customs revenue, Suba Dry Port, Paired sample t-test.

JEL Classification: F13, H25, H27

المخلص

تعد الإيرادات الجمركية مصدراً أساسياً لتمويل الحكومات في البلدان النامية. تلعب إدارة المخاطر الفعالة دوراً بارزاً في تحسين جمع الإيرادات الجمركية. هدفت هذه الدراسة إلى استكشاف تأثير إدارة المخاطر على الإيرادات الجمركية عبر دراسة الأداء المالي لميناء سوبا الجاف. وذلك عبر استخلاص بيانات الإيرادات الجمركية المستخلصة من تقارير هيئة الجمارك السودانية لميناء سوبا الجاف. تم استخدام اختبار تي للعينات المقترنة لتحليل البيانات. أظهرت النتائج أن تنفيذ ممارسات إدارة المخاطر أدى إلى زيادة ملحوظة في جمع الإيرادات الجمركية. تشير نتائج الدراسة إلى أهمية إدارة المخاطر الفعالة في تحسين جمع الإيرادات الجمركية وإمكانية تطبيقها في الموانئ الأخرى لتعزيز أدائها المالي.

الكلمات المفتاحية: إدارة المخاطر، العوائد الجمركية، ميناء سوبا الجاف، اختبار ت للعينات المقترنة.

التصنيف حسب JEL: F13, H25, H27

Introduction

Customs revenue is a crucial factor in the financial stability and growth of governments, especially in developing countries. However, the process of customs revenue collection can be challenging and is often plagued by a range of issues that hinder revenue generation. These challenges can include corruption, smuggling, and trade fraud, among others. Thus, it is essential to employ effective risk management strategies to overcome these challenges and ensure efficient customs revenue collection.

Risk management refers to the process of identifying, assessing, and mitigating risks to achieve organizational objectives. In the context of customs revenue, risk management involves identifying and mitigating risks that affect revenue generation. Effective risk management strategies can help prevent revenue loss and enhance revenue collection. Therefore, it is crucial to study the impact of risk management on customs revenue collection to understand the effectiveness of different risk management practices.

This research aims to investigate the impact of risk management on customs revenue collection in the Suba Dry Port. The Suba Dry Port is an essential hub for customs revenue collection in Sudan and is therefore an ideal location to study the impact of risk management strategies. The research will evaluate the effectiveness of the risk management system implemented at the Suba Dry Port and analyze its impact on revenue generation. By understanding the impact of risk management on customs revenue collection, this research can contribute to the development of effective risk management strategies for customs revenue collection worldwide.

Problem Statement

Customs revenue plays a crucial role in the economic growth of a country, and effective risk management is essential for improving revenue

collection in ports and other customs facilities. While the implementation of risk management practices has been recognized as an important factor in enhancing customs revenue collection, there is a lack of empirical research on the impact of such practices on revenue collection in the context of Suba dry port in Sudan. Therefore, the main objective of this study is to investigate the role of risk management practices in improving customs revenue collection in Suba dry port between 2014 and 2019. Specifically, the study aims to determine the extent to which the implementation of risk management contributes to the improvement of customs revenue in the port.

Hypotheses

The implementation of risk management contributes to the improvement of customs revenue

Methodology

A quantitative research approach was adopted in this study. The research utilized secondary data from the reports of the Sudan Customs Authority. The study focused on the customs revenue data for the years 2014 - 2019. The data was analyzed using a paired sample t-test to determine the statistical significance of the difference between customs revenue generated before and after the implementation of risk management practices.

Previous Studies

Several studies have investigated the role of risk management in customs revenue improvement. For example, a study conducted by Wang et al. (2021) examined the impact of risk management practices on customs revenue in China. The results showed a positive relationship between risk management and customs revenue improvement (Wang, Chen, Cao, & Wang, 2021). Similarly, a study by Ayub et al. (2019) explored the impact of risk management on customs revenue in Pakistan. The findings revealed that

effective risk management practices can significantly improve customs revenue collection (Ayub, Ali, & Qaiser, 2019).

Comparison with Current Study

Compared to previous studies, the current study aims to examine the role of risk management in customs revenue improvement, specifically in the context of Dry Port in Sudan. This study adds to the existing literature by exploring the potential benefits of risk management practices in a new context and examining the extent to which these practices can be applied in a different setting.

Overall, while previous studies have provided evidence of the positive impact of risk management on customs revenue improvement, this study seeks to contribute to the literature by investigating the applicability of these practices in a new context.

2. Risk management

Risk management is a crucial process for any organization to effectively address and mitigate potential risks that could negatively impact its operations and objectives (Horngren, Sundem, Stratton, Burgstahler, & Schatzberg, 2012). According to the International Organization for Standardization (ISO), risk management is defined as the "coordinated activities to direct and control an organization with regard to risk" (International Organization for Standardization, 2018). In the context of customs management, risk management is a critical component of effective customs control and is necessary to ensure the safe and secure movement of goods across borders (World Customs Organization, 2020).

The process of risk management involves identifying, analyzing, evaluating, and mitigating potential risks. Risk identification involves the recognition and documentation of potential risks, which can be accomplished through the use of various risk assessment tools and

techniques (Ayub, Ali, & Qaiser, 2019). Risk analysis involves the examination of the identified risks in terms of their likelihood and potential impact, while risk evaluation involves determining the significance of the risks based on established criteria (International Organization for Standardization, 2018). Finally, risk mitigation involves the implementation of measures to address and manage the identified risks (Kaplan & Mikes, 2012).

Effective risk management is essential to the success of any organization, particularly those involved in customs operations, as it helps to ensure compliance with laws and regulations, protect revenue and assets, and enhance the efficiency of operations (World Customs Organization, 2020). In the context of customs management, effective risk management can contribute to improved customs revenue by identifying potential revenue leakage points and implementing appropriate measures to mitigate these risks (Ayub, Ali, & Qaiser, 2019). Therefore, it is important for organizations involved in customs operations, such as dry ports, to have a robust risk management framework in place to effectively manage risks and improve customs revenue.

3. Risk Management In Sudanese Customs

The establishment of risk management in Sudanese customs dates back to 2009, when it was created as a branch of the Planning, Organization, and Research Department. The World Bank provided consultations and technical assistance to establish the system and to train officers internally and externally. The actual work began in 2015, and the customs authority fulfilled the material and human requirements, and it was approved by the customs authority's head who issued administrative order number 19 for the year 2015. Necessary administrative paperwork was also issued, and several private sector companies and institutions were elected to establish the

Golden List system. Khartoum International Airport was chosen as the starting point for this work.

3.1 The Risk Management System In Suba Dry port And Other Stations

The Risk Management System was first applied as a pilot project at Khartoum Airport to overcome losses. After the success of the system at Khartoum Airport and the appearance of its results and benefits in facilitating trade and its movement, work began on the rest of the customs stations. To apply the system in these stations, a sample was required from all stations, whether they were dry ports, seaports, border crossings, etc., in order to facilitate its generalization. The first sample taken was the dry port of Suba and the system was applied there.

To implement a risk management system at the station, several stages must be passed through, including:

A. Gap Analysis Study: During this stage, the customs certificate is studied on the ground to determine its movement and standards.

B. Analysis of customs declaration data for the concerned station: Provides a complete clarification of the station (officers, suppliers, and brokers, etc.).

C. Customs Certificate Cycle Reengineering: Requires physical inspections, including the ASYCUDA hall, which facilitated the customs clearance process. All customs offices were gathered in one place to save time and effort.

3.2 Red lane

All customs data that are directed to the red lane must be physically inspected and compared to the accompanying documents after verifying

those documents before the final settlement process (calculating the final fees).

The importer cannot clear their declaration until the actual inspection is completed, and the declaration is transferred via the system to the green lane by authorized clearance unit heads, if the inspection and verification results are matched. Otherwise, the declaration is transferred by the Clarifications Department in case of any discrepancies. It should be noted that the unit heads have the authority to know why the declaration was selected for the red lane or not.

3.3 Yellow lane

This lane requires verifying the customs data and comparing it to all accompanying documents before the final settlement process. If they match, they are transferred to the green lane and settled. But if the documents do not match the declaration and the permits on the declaration, the declaration is transferred to the red lane for inspecting the contents and verifying the documents against the actual goods.

3.4 Green lane

This lane is for customs data that contains types of goods that are not targeted within the adopted selection standards or if the importer is among the committed persons or companies that do not pose any risk to customs (or the risk ratio is low), where the declaration is settled directly without verification, as it is in the yellow lane. However, it is later audited by the internal control in the Centers, and if there is any risk to customs, they will not benefit from the green lane advantages, and they become targeted according to the terms and conditions that have been set.

The green lane is transferred for one of the following reasons:

1. Receiving information from the Customs Intelligence Branch or any other security agency.

2. Receiving information from any Customs officer or non-commissioned officer and soldiers.

Filling out the form prepared for this purpose with the reasons for transferring the lane and sending it to the Risk Management representative to benefit from it in updating the lanes, with clarification of the lane transfer result.

4. Paired T Test

The paired t-test is a statistical test used to determine whether there is a significant difference between two related samples. It is used when the same subjects are measured twice, or when two groups of subjects are matched in some way. The test is based on the difference between the means of the two samples, and determines whether that difference is statistically significant.

According to Statistics for Research by George Argyrous, "The paired t-test is used to compare the means of two related groups of observations. Examples include pre-test and post-test measurements of the same variable on the same subjects, or observations on pairs of subjects matched for age, sex, etc." (Argyrous, 2013)

The paired t-test is a widely-used statistical method for comparing two related samples. It assesses the significance of the difference between the means of two groups by considering the differences between corresponding pairs of observations. This test is often used in situations where the same subjects are measured at two different time points or when two groups of subjects are matched based on certain criteria. In our study, the paired t-test was used to analyze the financial performance of the Suba Dry Port before and after the implementation of the risk management system. Specifically, we calculated the mean difference in annual revenue generated by the dry port before and after the implementation of the system and then used the t-test to determine whether this difference was statistically significant.

In order to ensure that the results obtained from the paired t-test were statistically significant, a confidence level of 95% was used. This means that the test was designed to be accurate 95% of the time. The formula used to calculate the t-statistic was:

$$t = (\bar{x}d - \mu d) / (sd / \sqrt{n})$$

where $\bar{x}d$ is the sample mean difference between the two related groups, μd is the hypothesized population mean difference, sd is the sample standard deviation of the differences, and n is the sample size.

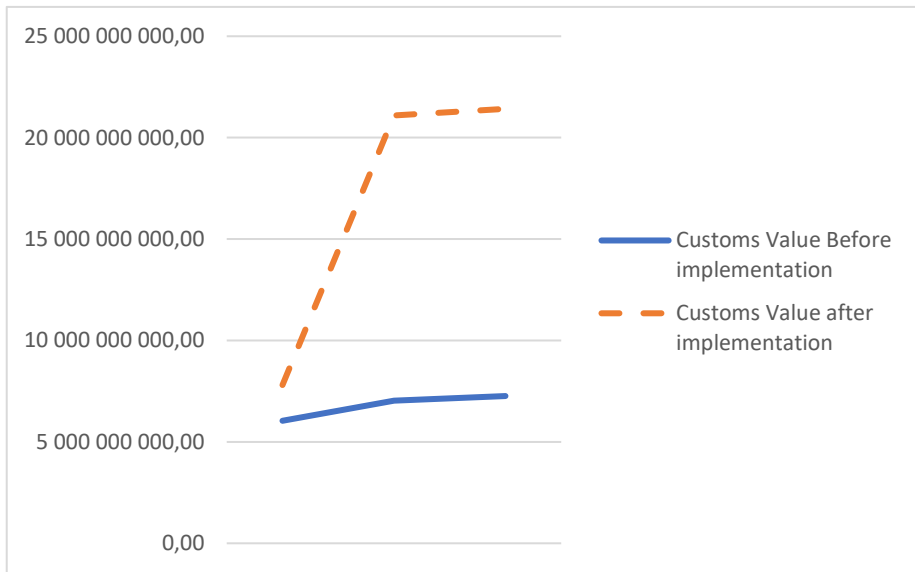
Furthermore, the sample used in this study consisted of the annual revenue data for the Suba Dry Port from 2014 to 2019. This time period was chosen in order to evaluate the impact of the risk management system on the financial performance of the dry port over a reasonable time frame. The data was obtained from the reports of the Sudan Customs Authority, which provided a reliable and comprehensive source of information for the study. It is important to note that the data was collected from the same dry port both before and after the implementation of the risk management system, ensuring that the samples were related and met the requirements for the paired t-test.

The study aimed to evaluate the financial performance of the Suba Dry Port before and after the implementation of the risk management system. In order to achieve this objective, the annual revenues of the dry port were collected and analyzed. The revenues were divided into two distinct periods:

1. The first period, which spanned the years 2014-2016, represented the period before the implementation of the risk management system.
2. The second period, which spanned the years 2017-2019, represented the period after the system was put into effect.

As shown in the figure below.

Fig. 01: The financial performance of the Suba Dry Port 2014 - 2019.



Source: researcher Preparing.

Based on the above figure, it is evident that the financial performance of the Suba Dry Port improved after the implementation of the risk management system. This improvement in financial performance may be attributed to several factors, such as the identification and mitigation of potential risks, more effective resource allocation, and increased stakeholder confidence. By contrast, the financial performance of the Suba Dry port prior to the implementation of the risk management system was likely obstructed by a lack of risk awareness and management, leading to unanticipated losses and inefficiencies. Overall, the implementation of a comprehensive risk management system can significantly enhance the financial performance and operational efficiency of organizations, particularly those operating in complex and dynamic environments like the shipping industry.

To ensure that the financial performance improved after the implementation of the system, the best test to be used is the paired sample t-

test, which assumes the null hypothesis that there is no statistically significant difference in financial performance attributed to the implementation of the risk management system. This test is appropriate because it compares the performance of the same entity before and after the implementation of the system, controlling for any external factors that could affect the results.

Table.1: The revenue performance of the Suba Dry Port 2014-2019.

CUSTOMS VALUE	Mean	N	Std. Deviation	Std. Error Mean
BEFOR IMPELMENT RISKMANAGEMENT	6,778,419,795	3	648,258,313	374,272,112
AFTER IMPELMENT RISKMANAGEMENT	16,771,846,420	3	7,769,017,173	4,485,444,156

Source: researcher Calculation

The table above indicates that the mean revenue performance of the Suba Dry Port has been calculated and divided into two means, one before the implementation of the risk management system, and the other after the implementation of the system. It is evident that the mean revenue performance of the Suba Dry Port after the implementation of the risk management system is nearly three times greater than the mean revenue performance before the implementation of the system.

Table.2: The Correlation of performance for the Suba Dry Port 2014-2019.

CUSTOMS VALUE	N	Correlation	Sig.
BEFOR IMPELMENT RISKMANAGEMENT & AFTER IMPELMENT RISKMANAGEMENT	3	0.988	0.048

Source: researcher Calculation.

The above table shows a strong positive correlation (99%) between financial performance before and after the implementation of the risk management system, which is statistically significant. This correlation is consistent with the fact that the data and measurement were applied to the

same station (Suba Dry Port), so it is reasonable to expect a statistically significant correlation.

Table.3: The paired T test value.

	Paired Differences	t	df	Sig. (2-tailed)
CUSTOMS VALUE	Mean			
BEFOR IMPELMENT RISKMANAGEMENT				
AFTER IMPELMENT RISKMANAGEMENT	-9,993,426,625	-2.93	2	0.04

Source: researcher Calculation.

The above table shows that the t-test value for two related samples is (2.39) at a statistical significance level less than (0.05). This indicates rejection of the null hypothesis and acceptance of the alternative hypothesis, meaning that there are statistically significant differences in the financial performance of the Suba Dry Port attributed to the implementation of the risk management system.

5. Discussion the Results

The results of the study indicate a statistically significant difference in the financial performance of the Suba dry port before and after the implementation of the risk management system. The paired-samples t-test yielded a t-value of (2.39) with a significance level of less than (0.05), indicating the rejection of the null hypothesis and acceptance of the alternative hypothesis.

These findings suggest that the risk management system has had a positive impact on the financial performance of the Suba dry port. This is consistent with previous research that has emphasized the importance of effective risk management in improving organizational performance.

However, it is important to note that the study was conducted on a single station (Suba dry port), and the results may not be generalizable to other organizations or industries. Future research can be conducted to replicate and validate these findings in other contexts.

In summary, the results of this study provide empirical evidence supporting the positive impact of the risk management system on the financial performance of the Suba dry port. These findings can be useful for managers and decision-makers in enhancing organizational performance and reducing potential risks.

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