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ANALYSIS OF ACTIVITY PRODUCTIVITY IN GOVERNMENT AIR TRANSPORT ORGANIZATIONS: BASRA INTERNATIONAL AIRPORT, CASE STUDY

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ABSTRACT:
The current research aims to present a method of productivity analysis on the basis of activity in government service institutions, which is a modern method of cost accounting, aimed at providing accounting information that helps to make improvements in the performance of the activity, it has been applied to one of the government air transport institutions, which is Basra International Airport, Airports are multi-product institutions that perform a variety of activities and services. This diversity requires a cost accounting system that measures and evaluates performance efficiently and effectively.

The research found that a productivity-based analysis method provides useful information for government airport management that enables it to make productivity improvement decisions and improve the performance of various airport activities, which reflects positively on the quality of services provided to citizens.

INTRODUCTION:

Governmental service institutions, including air transport organizations represented in the airports, provide general services to citizens, airports are a necessary means of transportation as airlines fly the needs and desires of individuals (and tourists) from their original places to their fulfillment or fulfillment places.

Airports are important economic institutions that provide multiple services. Each airport provides a range of services such as passenger transport, aircraft reception, landing and takeoff ... etc.

In order for airports to play their role effectively in the economy and provide high-quality services to citizens, they can use cost-accounting techniques related to improving productivity and provide beneficiaries with appropriate financial information about the airport's financial position, results and productivity of operations for the main activities or services provided by the air transport industry in particular at the airport.

The current research aims to apply the method of productivity analysis on the basis of activity in air transport institutions - government airports, which is a cost accounting technique used to measure and analyze productivity, this method was applied to the case of the study sample, which is Basra International Airport.

To achieve this, the research deals with the following axes:
First: Importance of air transport industry in government service institutions
Second: Main activities in Airports
Third: Measuring and analyzing productivity at the airport
Fourth: Improving productivity in government airports
Fifth: Activity based productivity analysis
Sixth: Activity based Productivity analysis at Basra International Airport

Research Problem

Airports are important government institutions that carry out multiple activities to provide various services to citizens. In order for these huge institutions - with large capitals - to play their role efficiently and productively, they need to use appropriate techniques to calculate costs and assess performance and productivity. The research problem can be formulated in the following question:
Does using activity-based productivity analysis provide accurate and appropriate information for assessing and improving performance in government airports?

Research Importance

Airport managers need elaborate financial data to help conduct an analysis of the airport's financial performance, and to reach this endeavor, it is necessary to organize the financial statements on a modern accounting basis for the various cost centers at the airport, so it is possible that the current research is useful for airport management, to assist it in the process Evaluating the performance and productivity of the various activities carried out by the airport in a fair and satisfactory manner for all parties concerned.

Research Objective

The research aims to review and apply the method of analyzing productivity on the basis of activities at the airport, and the importance of this technology in providing the information necessary to evaluate the performance and productivity of activities at airports, because this task has a significant impact

in improving the performance of the (financial situation) of airports in particular and the development of the national economy in general.

Research Hypothesis

The use of productivity analysis based on activity at the airport provides accurate and appropriate information for assessing and improving the performance of activities at the airport.

First: Importance of Air Transport Industry in Government Service Institutions

Government entities of various kinds seek to provide public services of high quality to citizens, in light of the challenges of competition ,efficient and effective use of restricted resources (PWC, 2014: 3), The purpose of establishing these entities is to provide a service that acquires the satisfaction and confidence of the citizen (the customer), the main goal of providing financial reports is to provide information about the financial performance of the government entity during a specific period (Granof et. al., 2016: 28).

Service government institutions are government entities with an economic activity aimed at achieving profit, and this sector is established with capital and does its work in return for. Ends his accounts by matching its expenses and revenues to know the result of its activity, from profit or loss. These governmental institutions, in addition to their social function, provide public services, satisfy the needs of citizens, and achieve economic development. These institutions are distinguished by their compliance with some economic laws and accounting systems.

Airports are examples of government air transport organizations. The public ownership of airport facilities, services, operations, and activities associated with it, represents the most common model for airport management in the world (Estache, 2000: 55). Government or public ownership may take the form of direct control and management, for example through an administration responsible for civil aviation, or through another ministerial administration, or for aircraft. Air transportation is the economic field that includes all forms of transporting individuals and goods for civil or military purposes, and it is considered one of the most important industries in the world, and the development witnessed by this industry and the technical and service achievements it provides make the air transport industry one of the largest industries contributing to the development and progress of modern society, Since the first jet plane flew in 1949, and to this day, the use of commercial aviation has grown more than seventy times (ATAG,2014) ,this growth is not matched by any other form of transportation, which shows the necessity and importance of air transport for economic progress and development.

The demand for air transport services increases the impact of air transport on the global economy, which makes it possible for millions of people and billions of dollars of goods to move and move in the markets and around the

world. Air transport is vital within the ongoing process of cultural globalization, social, economic and sustainability (Carlucci et. Al.,2018).
To improve the activities of the airport institution and improve the service provided to citizens, it is possible to use cost accounting techniques. When cost is combined with an effectiveness measure, it can show cost-effectiveness (IFAC,2000:10). Thus, the service efforts and accomplishments of an entity can be evaluated with cost accounting measures.

In the current research, a productivity analysis technique will be applied on the basis of the activity for the purpose of improving productivity and contributing to achieving the social and economic development of the country.

Second: Main Activities in Airports

Airports are characterized by being multi-product institutions (Estache, 2001: 86). Airports provide a variety of services for which users pay their fees, which include landing services, aircraft parking places, transport routes to and from the plane, passenger and security buildings, and other services. This multiple and diverse grouping of activities is a complex system that meets a wide range of needs associated with the movement of people and goods across the world.
Airport functions can be categorized in a number of ways, including, for example, the following (ICAO Doc. 9562,2013):

- Administration and finance.
- Operating airport facilities and services.
- Engineering, construction and maintenance work.
- Marketing and PR.
- Ground services.
- Air Traffic Operations.
- Security, Immigration, Health and Customs.

Each of the above functions includes a wide variety of activities ranging from air activities that focus on air traffic management, passengers, cargo movement, and ground activities that relate to commercial operations and services provided on the airport grounds.

ICAO has listed a set of services and activities that must be taken into consideration by airport operators (ICAO Doc.9082,2012):

- Services and equipment needed for approaching, landing and takeoff
- Airport buildings, aircraft parking places, barns and other equipment and services provided to aircraft operators
- Security personnel procedures, and equipment.
- Places of other entities other than aircraft operators, such as places of shops, hotels, restaurants, ground transportation service providers, banks, and places designated for government activities, customs, health, etc.
- Procedures to reduce and prevent noise
- Air Traffic Management
- Communication, navigation and surveillance systems
- Meteorological and other subsidiary air services

The multiple and varied activities of the airport associated with meeting the needs and desires of various users and beneficiaries creates a complex system for the airport, characterized by the diversity and multiplicity of costs and expenses needed to provide these services and carry out these activities (Vasigh and Gorjidooz, 2006: 146).

The current research uses the technique of productivity analysis on the basis of activity and applies to the case - Basra International Airport - the sample of the research for the purpose of analyzing and explaining the improvement in the performance of airport activities.

The multiplicity of activities and services provided at the airport means the multiple types of revenue earned, as well as the costs that can be charged to the financial period.

Revenues is classified according to its relationship with airport activities and services into revenues related to aviation activities, and revenues not related to aviation activity, these are revenues that the airport achieves through various commercial measures related to granting concession rights, rental or leasing of buildings and lands, and free zone operations, even if such measures actually apply to activities that can be considered to be of a flight related nature(Chin and Teik, 2014: 132).

This item also follows the gross revenues, minus the sales tax or other taxes, that are achieved by the shops or services that the airport operates. The size of the airport also has a direct and clear relationship and revenue sources generated from airport services. Large-sized airports are more capable than medium and small-sized airports to exploit and invest commercial activities and thus obtain more diversified sources of revenue (World Trade Organization, 1998). By contrast, small-scale airports rely almost exclusively on revenue related to aviation activities only.

As for the airport costs, they are classified into two types. The first is the costs associated with the terminal buildings, which are costs that depend on the flow of passengers to the airport. And second, the costs associated with the runway system (runway) at the airport, which are determined based on the number of aircraft arriving from and to the airport.

The cost to be shared is the full cost of providing the airport and its necessary subsidiary services, including calculating appropriate amounts for the cost of capital and asset depreciation, as well as the cost of maintenance and operation and management and administration expenses, but taking into account all aviation operations revenues in addition to contributions from other revenues, that airport operators achieve from operating it (ICAO Doc. 9562,2013).

Third: Measuring and Analyzing Productivity at The Airport

Productivity is one of the keys to financial success of the enterprise, it is critical for the long-term competitiveness and profitability of organizations.

Productivity measures can be classified according to the type of data used in the measurement to operational productivity measures (quantitative / physical data) and financial productivity measures (financial data), and productivity measures may be partial or total. Table (1) shows known productivity measures.

Table (1) known productivity measures.

Type of output measure:	*Type of input measure*			
	Labour	*Capital*	*Capital & labour*	*Capital, labour & intermediate inputs (energy, materials, services)*
Gross output	Labour productivity (based on gross output)	Capital productivity (based on gross output)	Capital - labour MFP (based on gross output)	KLEMS multi-factor productivity
Value-added	Labour productivity (based on value-added)	Capital productivity (based on value-added)	Capital – labour MFP (based on value-added)	-
	Single factor productivity measures		*Multi-factor productivity (MFP) measures*	

Source: Schreyer,2005, Measuring Productivity, OECD.

Airports worldwide are no longer considered to be just mega installations and public facilities, but complex service organizations that operate commercially, a broader view of airport performance is needed, as well as the development of reliable performance measurement practices ((Bezerra&Gomes,2016:1). Performance measurement can be viewed as the government equivalent of private sector profitability measurements (IFAC,2000:10).

Performance and productivity measures are important financial management tools for airport managers, regulators and beneficiaries. The financial evaluation of airport performance has become increasingly important for airport managers due to global financial problems and crises. It allows managers to plan efficiently - as much as possible - financial resources and capital investments (Vasigh and Gorjidooz,2006:147).

Airports generally use significant resources in their daily operations. Failure to perform can result in significant additional costs for users and society as a whole, therefore, the goal of measuring performance and productivity is to improve performance efficiency and cost-effectiveness.

Performance measures are useful for setting organizational goals, areas of concern, preparing operational and financial plans, and improving accountability for individual managers. However, it should be emphasized that the primary objective of performance measurement is to assess and improve the performance of various activities over time at the airport (Humphrey and Fry, 2018: 264).

The productivity rates and analysis of its components give a closer look at the airport activity, and reveals the weaknesses and strengths in this activity, and the focus of productivity improvement is to perform the work in the right way, and with better efficiency, and not to work hard to achieve better results.
Productivity can be improved successfully if it is managed entirely and analytically. The productivity measurement for all inputs simultaneously is called Total Productivity Measurement (Hansen et al., 2009: 537), and there are two common ways are profile measurement and productivity related to earnings.

Productivity shows the relationship between airport outputs and its inputs, the general formula for measuring productivity is by dividing the outputs of the activity by its inputs, and to measure airport productivity by several formulas, including (ICAO doc. 9562,2013):

- ✓ Aircraft movement per employee
- ✓ Aircraft movement per gate
- ✓ Number of passengers, per employee.

Airport productivity can also be measured according to the following formulas ((Wang et al., 2004: 355):

- ✓ The amount of goods shipped to the number of employees
- ✓ Passenger traffic to the number of passenger terminals
- ✓ Revenue to number of employees
- ✓ Income from non-air activity to number of employees
- ✓ Aircraft movement to aircraft parking lots
- ✓ The movement of travelers to the air bridges.

Fourth: Improving Productivity in Government Airports

An improvement in productivity is fundamental to economic growth, as it allows inputs to be used more effectively and efficiently (Myronenko, 2012: 27). Improving the economy depends in large part on improving productivity in the government sector, including airports. Productivity is not about spending more or from top to bottom, but being more customer-responsive, employee support and information and communications technology harnessing, and providing more public services with less public spending is an ongoing challenge for the government (ICPAK,2017:5).

Productivity indicators measure the effectiveness and efficiency of the inputs given in generating the outputs. Labor productivity and capital productivity are two examples of productivity indicators ((SPRING Singapore, 2011:6). For airport administrations, they should choose areas of measurement that focus on improving what is important. For many airports, an increase in the number of aircraft operations is imperative. For other airports, reducing airport congestion and delays is a significant goal, and performance measures can apply to all aspects of the airport, and not only its operations related to the movement area and the area open to the public, but also to its safety, security and commercial practices. A critical assessment of the airport process can

provide important information on the safe and effective movement of passengers and air-borne cargo. Whatever the aim is, airport managers must choose among the performance areas in their endeavors to achieve this goal while continuing to achieve a number of other secondary goals.
Measuring performance includes measuring productivity, which indicates ensuring the use of resources in the most effective way, and that ability is put in place to use the highest level of value, and that investments are aligned with customer needs to achieve the maximum benefits, as well as measuring the quality of service, i.e., ensuring that the level is consistent Service with customer needs and legal obligations.

To measure, understand and improve airport performance, there are several indicators (metrics) ranging from runway management, understanding the impact of operational procedures and management of delay and operational flexibility, to optimizing ground operations,including safety management and passenger security checks, and luggage systems (Mota and Delahaye, 2017: 3).
In addition to other performance indicators such as the state of the roads leading to the hall, parking services, luggage transport service, the satisfaction of the passenger public with the levels of service for completing travel procedures, the waiting period in the security inspection queue before completing the travel procedures, the adequacy of flight information screens, and some public utilities, food and retail service, and some information on the airport.

For airports, there are three categories of performance-related metrics (ICAW 9562,2012) which are inputs, outputs, and outputs.

Input metrics record resources such as personnel, facilities, and purchased services used to achieve airport outputs. Output metrics represent the capacity provided and the quantities of services produced.

The outputs involve a quantitative and qualitative dimension. An example of an output measurement is the number of plane movements during a specific time period. The measures that are based on the outputs describe the development or success in achieving a goal, for example, reducing the number or rate of aircraft accidents from one year to another, or reducing the cost of service for one plane in relation to the airport, or reducing the average delay of the aircraft. Dunleavy mentions five essential steps in measuring productivity in the public sector, the most important is identifing the ‘core’ outputs or activities of the agency (Dunleavy,2015:5).

In this paper, the productivity analysis technique will be applied on the basis of activity.

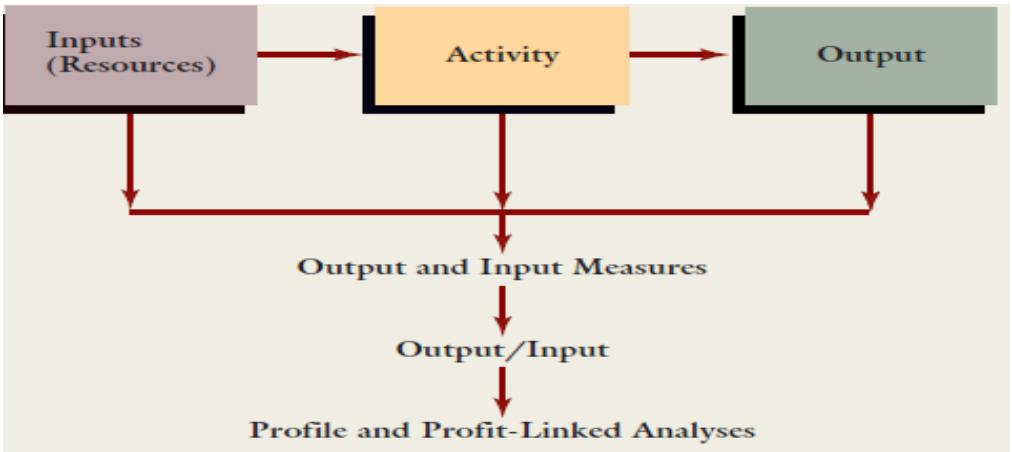
Fifth: Activity-Based Productivity Analysis

The principles and philosophies of activity-based thinking apply equally to service companies, government agencies and process industries beside manufacturing companies. Activity-based management and activity-based

costing (ABM/ABC) have brought about drastic change in cost management systems. (CIMA,2001,1), **(**Horngren et. Al.,2012:146) believe that ABC improves a costing system by identifying individual activities as the essential cost objects. Activities at the enterprise level can be divided into two types of activities that add the value of any activities performed in an efficient manner, and activities that do not add value and that perform inefficiently causing additional costs. This technique probably generates more accurate product costs than a traditional costing system, so it can be used to improve cost management and profitability (Hansen et. al.,2009:96). **ABM** is a method of management decision making that uses activity-based costing information to improve customer satisfaction and profitability (Horngren et. al.,2012:156). Activity-based costing/activity-based management provide cost and operating information. The emphasis of ABC is on accurate information about the exact cost of products, services, processes, activities, distribution channels, customer divisions, contracts, and projects. Activity-based management involves focusing on activities by using this cost and operating information to eliminate waste, decrease processing time, and reduce defects.

Measuring changes in activity efficiency can be a key part of an activity-based management system, Hansen et. al. refers to this as "activity productivity analysis"(Hansen et. al.,2009:541). Activities involve of the collection of many different jobs, actions or units of work that cause the consumption of resources (Drury,2018:257), it can be described as a unit that convert inputs into outputs. The input consists of the pool of resources consumed by this unit (activity) such as raw material, labor, capital, and overheads.

Activity productivity analysis requires an accurate definition of those inputs and outputs, Figure (1), illustrates activity productivity analysis model.



Source: Hansen Et. Al. ,2009:541, Cost Management: Accounting and Control, 6th Edition.

Sixth: Activity Based Productivity Analysis in Basra International Airport

Basra International Airport is the second largest Iraqi airport, established in 1981, it is about 17 km away from the city center of Basra with an area of 35 km, it is surrounded by a security fence of 23 km long. Basra International Airport consists of one building with a capacity of (3)million passengers annually, and contains 5 air bridges to park the aircraft, the airport contains a runway of 4 km in length and 60 meters in width, with Zoghan road with a length of 4 km and a width of 45 meters, and a parking space for the aircraft, the airport also contains buildings (air control, communications) and the airport is equipped with all devices That ensures air traffic safety and providing services to passengers Central and Northern region Pulleys in emergency situations such as poor vision or, disasters and others.

The productivity analysis model will be applied based on the activity of aviation activity in Basra International Airport for the years 2017 and 2018, and by using a set of operational productivity indicators for airports.

Table (2) displays the most important input and output indicators for aviation activity for Basra International Airport for the years 2017 and 2018:

Table (2) Important input and output indicators for aviation activity for Basra International Airport

Outputs		Inputs					Year
Total number of passengers	**Total number of flights**	Number of airlines operating at the airport	Capacity of passenger's terminals	Airplane parking lots	aircraft hangars	runways	
588811	6736	17	One building with a capacity of 3 million passengers	10	5	1	2017
609137	6663	13	One building with a capacity of 3 million passengers	10	5	1	2018

Aviation activity data for 2017 and 2018 are as shown in Table (3):

Table (3) Aviation activity data for 2017 and 2018

	2017	2018

Total number of flights	**6736**	6663
Total number of passengers	**588811**	609137
Number of airlines operating at the airport	**17**	13
Airplane parking lots	**10**	10
Number of Hangers	**5**	5
Capacity of passenger terminals	**One building with a capacity of 3 million passengers**	One building with a capacity of 3 million passengers

To analyze the productivity of aviation activity, the data of the previous year 2017 can be used as a basis for comparison with what was accomplished in 2018, that the use of activity productivity analysis provides management with useful information in assessing the improvement in the activity concerned with the analysis, as it reveals any defects or deficiencies in productivity, activities that add value and those that do not add value , any of the costs that add value and those that do not add value to the activity. Table (4) shows the analysis of the productivity of aviation activity according to several separate and distinct measures of the airport's operational productivity.

Table (4) Aviation Activity Productivity Analysis in Basra International Airport

Aviation Activity Productivity Analysis		
Operational Productivity Measures	2017	2018
Average flying movement:		
✓ The number of flights to the number of aircraft hangars ✓ The number of flights to the number of runways ✓ The number of flights to the number of Airplane parking lots	1347flight per hangar 6736 flight per runway 674 flight per parking lots	1333 6663 666

Average passengers' movement:		
✓ Number of passengers to the number of aircraft hangars ✓ Number of passengers to Capacity of passenger terminals	117762 passenger per hangar 20%	121827 20%

It is noted from Table (4) that an analysis of productivity on the basis of aviation activity for the airport reveals the existence of some problems or bottlenecks, which enables the airport administration to identify the reasons that led to its existence and find the necessary solutions to address it, and to improve the performance of these activities in the future. An improvement in the level of services provided to travelers, in 2017 the productivity of aviation activity was in accordance with the movement of aircraft 1347flight per hangar, while productivity decreased in 2018 to 1333, this requires researching the reasons for this decline and addressing it for the purpose of improving the performance of aviation activity and thus improving the service provided to the citizen. By noting the most important entrance Production data for the airport for two years, and the change happening between them, we find that one of these inputs on the number of airlines operating at the airport, has changed to decline, with the other inputs remain unchanged, this led to low productivity. This information is useful to the airport management in reviewing its policy with airlines and to address this component in a serious way to improve productivity.

As for the productivity index according to the movement of passengers, it was 117762 passenger per hangar in 2017, while it increased in 2018 to 121827, which means an improvement in productivity and the performance of flight activity, and with the inputs related to the productivity index of passenger movement remaining unchanged for the two years under study, productivity increased, which means an improvement in activity performance and in the quality of the service provided.

Therefore, analyzing productivity on the basis of activity helps to reduce costs and make improvements to production efficiency, by identifying activities that do not add value and are unnecessary activities, and to detect glitches in activities that are not performed efficiently, and accurately identify activities that lead to increased Costs and activities that reduce costs, activities that suffer from bottlenecks, and activities that are not fully utilized, and help in addressing them, and reduce their costs. Also, this analysis helps to detect activities that add value and then focus on them for the purpose of improving the activity performance and the quality of the service provided.

CONCLUSION

In the current research, a method of productivity analysis was presented on the basis of the activity that was applied to the aviation activity of Basra International Airport, that the airport is characterized by being a multi-product

institution, given the multiplicity of activities and services provided at the airport related to meeting the needs and desires of various users and beneficiaries, that creates a complex system The airport is characterized by the diversity and multiplicity of costs and expenses required to provide these services and carry out these activities, as well as the diversity of revenue sources that can be gained from those activities and services, and this necessarily requires the use of cost accounting tools that are compatible with the diversity and multiplicity that It features the airport. It can be said that the use of productivity analysis on the basis of activity adds value to the airport institution, by providing it with useful information that enables it to assess and improve the performance of the activity, and the overall performance of the airport, this confirms the research hypothesis that "the use of productivity analysis on the basis of activity at the airport provides accurate and appropriate information to evaluate and improve the performance of activities at the airport ".

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