International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

Importance of Strategic Cost Management in Airline Management: Implementation of Kaizen Costing in Turkish Cargo

Maict Deniz[1], Macit Armağan[2]

[2]Aviation High School, Ege University, Turkey

Abstract: ***In this study, it has been investigated how cost minimization can be achieved by using airline companies' strategic cost management methods and using kaizen costing for production operations. Within the scope of the study, attempts were made to investigate the processes of the air cargo operations and the operation processes of the Turkish Cargo operation, how to integrate the costing processes, how to implement the practices to reduce costs, and what to do to eliminate the missing factors. As a result, an operation process model proposed in air cargo operations can be used to improve the cost of the operator.***

Keywords: Air Cargo, Kaizen Costing, Strategic Cost

1. Introduction

The intense competition that emerged with the change and development taking place in the world reveals the necessity of businesses to protect themselves. Businesses that want to fulfill this necessity have begun to adopt different strategic approaches. The fact that businesses have to reduce costs in order to make profit, which is the main objective, has led to the grasp of the importance of strategic cost management (Erden, 2004: 44–56).

The high cost of emerging in other sectors has also emerged in the aviation sector because aviation companies are closely related to technology, being the sectors that are most affected by the crises, and being a sector that has rapidly increased competition with the liberalization of the 1980s.

The growth in the air cargo market after the 1980s has led to the addition of many new air cargo carriers to the aviation industry, which has become attractive. Therefore, increased competition among businesses has brought a rapid profit margin contest in the air cargo market. Air cargo operators want to increase profit margins are turning to strategic cost management and want to use the method that is appropriate for them. However, the fact that strategic costing methods are generally established for production enterprises causes air cargo operations, which is a service operation, not to benefit from these methods.

In this study, it was aimed to determine the air cargo processes and to give an opinion on how to implement the air cargo operation processes, which are kind of strategic cost management. Kaizen is at the outset of trying to improve the costs by fulfilling the requirements of the costs by air cargo operations.

In this study, which operates in Turkey and Turkish Airlines have worked a long time in the business hub of Turkish Cargo business located in the lower activity group has been made to Kayseri currently working in management positions at the station to meet with authority. In these negotiations, questions were asked to the managers about how Turkish Cargo operation looks at strategic cost management, at what stages air cargo operation processes occur, and how to implement it at cost. As a result of the interviews, the answers from the authorities and the literature reviews revealed how air cargo operation will be able to use the costing method and how much cost minimization can be achieved with this costing method.

Importance of Strategic Costing in Airline Management

In 1996, the Japan Accounting Association defined strategic cost management as " in the management activity where the targets are determined as quality, prices, reliability and delivery date; to create a target cost within the framework of the planning made from the moment the order is received; performing all kinds of factors that reduce the costs without reducing the quality at every stage of production; determine the appropriate selling price to the cost when the product occurs; perform all of these activities through continuous improvement" (Feil et al, 2004: 10).

Developing technology and increasing competition have led to a significant decrease in the profit margins of airline companies. The falling profit margins of the airline companies forced the airline companies to lower their costs due to the difficulty of increasing revenues in the service sector. For this reason, enterprises have tried to take control by analyzing their costs and aim to make continuous improvements.

It is important for the airline companies to provide strategic cost management effectively and to increase profit margin, and to ensure sustainable competitive advantage with the continuity of the enterprise.

2. Kaizen Costing

The Kaizen term first emerged in Japan, then spread to western companies. Keliman's meaning is constant improvement of the standard way of working. The compound with two concepts is a word: Kai (change) and Zen (better)

words (Palmer, 2001: 55–56). This approach, which is based on Continuous Improvement, aims to continually strive for perfection of production by incorporating every aspect of the organization (Malik et al., 2007: 695).

Kaizen was first used by Imai in 1986 to increase Toyota's productivity, productivity and competitiveness, a Japanese automaker after the rise of competition and globalization. Until then, Kaizen became a part of the Japanese manufacturing system, making a major contribution to manufacturing success (Ashmore, 2001: 212).

Kaizen costing is constantly trying to minimize the costs of manufacturing enterprises. It sets the target cost and adopts continuous improvement as the main activity even when this financial is achieved. It is argued that losses, wastages and idle resources are very important in reducing costs (Türk, 1999: 200).

In Kaizen cost method, product quality is one of the important details. It is important for kaizen costing to reduce the production or product quality while decreasing the cost. Kaizen costing emerges as a method of producing goods at a high cost with low cost (Aydemir, 2005: 176).

The Kaizen Costing system, which considers continuous improvement as the basic building block, takes place gradually as a process. Kaizen costing system; the system consists of four basic processes: the planning phase, the improvement phase of variable costs, the phase of harmonization between objectives and management, and the phase of determining target quantities (Alatas, 2015: 63–68).
In the planning stage of the system, production, sales and customer transmission plans of the products are made primarily. Cost planning of raw materials, semi-finished products and equipments used in production should be done afterwards. Then, ergonomicization of the production facility is tried to implement kaizen 5s. Effective planning of the personnel is followed by labor costs. Thereafter, an investment plan is made about the facility. Lastly, a fixed expenditure plan should be made (Yasuhiro and Lee, 1993: 24).

In the course of improving the variable costs, the costs of the operator are grouped. The importance ratings of the grouped costs, including variable and fixed cost, are set forth. Generally, the variable costs of businesses are always higher. For this reason, it is the phase in which the enterprises turn to variable cost items for cost improvement.

In the process of harmonization of management with objectives, implementation studies are carried out to determine objectives and realize these goals. The Kaizen costing targets are clearly defined and each unit and staff of the enterprise must be included in the cost planning, targeting and implementation stages. The amount of kaizen cost determined in the discussions between the enterprises is determined according to the management principle (Yasuhiro & Hamada, 1991: 27).
At the stage of determining the target quantity, actual costs and actual production quantities are compared first. After the estimated cost of the current period, the total current cost target is calculated. Afterwards, especially the variable costs are controlled and improved during the targeted studies (Yükçü, 2011: 122).

3. Air Cargo Operations and Cost

Although the air cargo transportation that emerged with the developing technology is not very old today, it has taken an important place in transportation modes itself (Yakut, 2012: 149). The purpose of carrying out the process of transporting a commodity which is required by the trade from one place to another has been added to the transportation types such as highway, railway and sea road which are used, the exploration of airplanes and the development of technology and air transport.

Known as the fastest and safest transportation type in the world, airline commenced airline cargo transportation due to the time constraints of its trade activities. Ever since air cargo transportation has emerged, it has become a sector that continues to grow. With the development of technology, air cargo transport continues to grow due to the advantages such as the discovery of new and larger planes, the rapid transportation type, and the possibility of making overseas activities possible (Çancı ve Erdal, 2003: 2).

Air freight forwarding has made a great contribution to the country's economy by providing economic relations with remote continental countries that have no economic relationship with each other.

After 2000, liberalization and privatization activities have improved the air transport in general and air cargo transportation has taken its present shape rapidly.

As of 2017, a total of 3.385.522 tons of cargo, 891,157 tons in domestic and 2,494,364 tons in international lines, have been carried by air cargo transportation. This indicates that cargo capacity has increased by 517% over the last decade (SHGM, 2017: 43).

Emerging technology, increased competition, has led to a large drop in profit margins for businesses. The same applies to air cargo operations. The decrease in profit margin of air cargo operations necessitates the reduction of air cargo costs. Enterprises that have to reduce costs must first analyze air cargo costs in order to be able to carry out their work in this direction.

3.1 Turkish Cargo

Turkish Airlines was established in 1933 as a national airline. In 1936, when the passenger claim was not very high, he carried the first international cargo and entered cargo transportation. In the early days, when the documents such as mail and documents were moved, the structure of the cargoes moved according to customer demand and expectations changed. Turkish Airlines' Cargo Division was assembled under the roof of "Turkish Cargo" during the restructuring process that took place in 2000 within the Turkish Airlines. Turkish Cargo has expanded its services with scheduled

cargo flights and additional trucking networks to improve regional trade and meet increasing customer needs. Turkish Cargo carries 296 city cargoes, as well as scheduled cargo flights with cargo planes. In addition, there are more than 494 trucks from 2930 destinations where there are no direct flights. In addition, there are 160 airlines with interline and over 80 airlines with SPA.

Turkish Cargo has scheduled flights to many destinations with its 35 ton capacity A310 and 65 ton capacity new generation cargo planes (http://www.turkishcargo.com.tr).

3.2 Integration of Kaizen Costing Processes into Air Cargo Operation Processes

Kaizen Costing For the application to air cargo operations, kaizen costing processes need to be integrated into the operations of air cargo operations. In short, it is necessary to determine at what stage of air cargo operations the vehicles that are costly to implement will be applied.

Under this heading, the processes of costing are made into the materials taking into account the implementation stages of the enterprises. Kaizen will discuss the costing processes one by one and how to implement them in air cargo operations. Implementation of Kaizen Costing in an enterprise consists of the following steps;

- Making Kaizen cost planning,
- Establishment of target costing and business expectations,
- Entrepreneurial adoption of the Kaizen costing system,
- Business managers are divided into functional teams,
- Implementation of Kaizen 5S management approach,
- 16 MUDA applications to exclude the activities that create losses,
- Adoption of a just-in-time service approach,
- Total Efficient Maintenance,
- Adoption of the Kaizen recommendation system,
- Poke-Yoke application,
- Measuring the effect of Kaizen on the service quality and the financial,
- Continuous improvement of Kaizen activities by constant repetition.

3.2.1. Planning of Kaizen Costing for Air Cargo Operations

In general, the product-producing operator's goal is to improve the production processes, and the cost of the production is expected to be improved within a certain plan to reduce the costs. The application structure of the Kaizen costing method is generally realized with a 6-step plan. The steps taken by Monden and Lee are as follows (Monden and Lee, 1993: 22–26).

Table 1: Kaizen Costing Planning Steps

Plans	*Beautiful Costing Plans*
Plan 1	Production, Distribution and Sales Plan
Plan 2	Cost Planning for Parts and Materials
Plan 3	Plant Rationalization Plan
Plan 4	Workforce Plan
Plan 5	Facility Investment Plan
Plan 6	Fixed Expenditure Plan

The cost structure of air cargo operations and the processes of air cargo operations must be considered in order to be able to apply the costing method in air cargo operations in the direction of our work.

The plans of the airlift operations of the air cargo operations are prepared as follows, taking into consideration the objectives of the plans in the above table and the costs of airlift operations.

Table 2: Kaizen Costing Plan Air Cargo Operations

Plans	*Plans for Air Cargo Enterprises*
Plan 1	Flight Operation Costs, Controlling Variable Costs in Logistics Costs
Plan 2	Determination of Targets for Fixed Logistics Costs and Indirect Operating Costs
Plan 3	Improvement of Air Cargo Operations in Ground Handling, Packaging and Recycling Fields
Plan 4	Taking Control of Direct and Indirect Personnel Costs
Plan 5	Reduction of Amortization and Lease Costs
Plan 6	Maintenance Costs, Advertisement and Promotion Costs, Controlling General Administration Expenses

As summarized in the above table, air cargo operations should first try to minimize the variable costs, which are flight operating costs and variable cost items in logistics costs, when applying costly planning.

In the second plan of the application, target quantities should be determined for fixed logistics costs and fixed indirect operating costs, and the objective should be determined not to exceed these objectives.

Plant improvement process, the third plan of the implementation process, includes improvements to the handling of the handling, packaging and recycling areas in a specific order.

The fourth plan of the Kaizen costing method should focus on staff costs. Personnel costs are both a direct and indirect cost burden for air cargo operations. For this purpose, this plan should aim to reduce these costs.

The fifth cost should focus on depreciation and rental costs of air cargo operations. Rental and depreciation expenses of aircraft and facilities used in the operation of air cargo operation are among the expenses that the operator can not prevent in determining the operating profit. However, if the business can effectively provide capital management, it can operate to reduce rental costs.

The sixth and final plan of the Kaizen costing method should be taken into account at the fixed costs. Maintenance costs, advertising and promotion costs and general management costs should be planned and implemented as minimum annual fixed costs, which are determined as annual fixed costs by the enterprise.

3.2.2 Target Costing and Business Expectations

The target cost figures should be targeted by the enterprise before the costing applications are carried out by the

enterprises, and it should be targeted how to reduce the cost according to the existing costs (Sakurai, 1996: 230).

In calculating Target Cost, it is important not only how much the operator wants to reduce the cost, but also the profit margin and the current costs. Manufacturing enterprises can achieve a cost advantage of about 10 % by using costly planning. For this reason, it is planned to reduce the costs by 10 % while planning kaizen target costs in production enterprises.

It is more difficult to improve costs due to the fact that the processes that create cost in service enterprises are concrete and the effects of sources and processes on service quality. For this reason, while target costs are being determined for service providers in a costly manner, slightly lower targets are set.

Air cargo operations are businesses operating in the service sector. For this reason, the target cost of an air cargo operation may be less than 10 %.

Conversations with Turkish Cargo officials say that costs can be reduced by 6–8 % when focused on cost-generating processes. For this reason, air cargo operations can target 6–8 % of the cost as the target cost of the process.

Not only target costing, but also the operator's expectation of this stage should be revealed. It is anticipated that air cargo operations will increase the quality of service by applying costly planning, having a dynamic structure of the operator, eliminating the loss factors, activating the workforce and providing more benefits from the workforce.

3.2.3 Adoption of Kaizen Costing System by Entire Enterprise

Air freight business is a business with many different departments, complex processes dominating and therefore a high number of jobs required by the workforce. At the same time, the workforce to be employed in air cargo operations must have legislation and practice on air cargo operations.

Kaizen puts the human factor, the workforce, at the center when it operates. The implementation of the Kaizen costing will be possible with the adoption of this practice by the worker.

The air cargo operation should train all the staff, especially senior management, about kaizen philosophy, kaizen costing's aims, targets, how to apply. The workforce should be educated about how to implement costly training together with training. How to reduce costs with feedback from the workforce, information about cost-generating events and losses should be obtained.

The embracing of the labor cost of the workforce in the air cargo operation of the workforce shows that it will be easier to apply the costing processes to the operation.

3.2.4. Business Managers' Staff Functional Teams

The first step in the implementation of Kaizen costing is the creation of functional work teams. When working teams are set up in production enterprises, it is desirable that at least one engineer is in each team and that people from different departments are involved. These work teams can express any kind of opinion about the improvement of the business processes and can inform them about the top management. The approaching of people from different departments through different perspectives on events leads to enlightening ideas for improvements. The creation of work teams also plays an important role in ensuring the participation of the labor force, which is the basis of kaizen philosophy, because it opens the way for the worker to express ideas more comfortably.

The creation of work teams in Air Cargo operations is a more complex situation than production operations. This is why air cargo operations are subject to a sector that provides 24/7 service. In the air cargo operations, the workforce working in the shift system works at different times, so the shift schedules must be taken into account when creating work teams. It will increase the interaction and conflict of ideas in the process of costly capitalization of people working in the same shifts on the same work teams.

In Air Cargo operations, it should be ensured that people on the same level are not in the same team in a position similar to a subject that must be careful when creating work teams. If people in the same position in the same position are in the same team, there will be an impact on ideas for improvement, which will cause the efficiency of the work team to decrease. Briefly summarized, it is suggested that people working in different positions and processes in the same shifts in working teams. The following diagram shows an example of a working team plan.

Table 3: Creation of Study Teams

Kaizen A-Team	Captain	**Shift** (08:00–17:00)
	Load master	
	Warehouse clerk	
	Equipment operator	
	Technician	
Kaizen B-Team	Captain	**Shift** (01:00–09:00)
	Load master	
	Warehouse clerk	
	Equipment operator	
	Technician	

3.2.5 Kaizen 5S Management Approach Application

The area where 5S management approach can be applied in Air Cargo operations are warehouse areas. Storage, classification, labeling, stacking and loading of cargoes are carried out in warehouse areas. For this reason, the working area of air cargo operation can be designated as warehouse. At the same time, the 5S management approach can be applied to the loading section of an airborne vehicle. The 5S management philosophy can be applied to air cargo operations in the following way:

-Classification;

It can be applied as an area to be used for warehousing in the warehouse area of the warehouse for the use of air cargo operations. The sections where the cargos will enter the warehouse area are the start part and the parts where the operations will be performed. The part where the last step

will be performed should be close to the exit part. At this stage all unwanted unused materials are removed from the warehouse area. The equipment to be used is classified by type and only available on the field. With this stage, it is possible that the warehouse activities of the cargo operations are accelerated, therefore the increase of the cargo circulation and the decrease of the unit costs.

-Arrangement;
The regulatory phase should be considered as the arrangement of the services and activities of the warehouse area. It should be decided where the activities are to be carried out, taking into account operational priorities, time constraints, work times and business processes. Air cargo operation will speed up the service processes of the warehouse area, where every staff member will be judged to be a regular judge. Materials should be arranged nearest to where they are to be used after equipment has been classified by type. This phase will contribute to the acceleration of the operational processes while at the same time increasing the service provision capacity. In this case, the unit will have a positive impact on cost reduction.

-Cleaning;
The cleanliness of the warehouse area plays an important role in preventing air cargo damage. Air cargo service for a wide range of products has to pay attention to cleaning activities because some products may be deteriorated from factors such as dust and smoke in the environment. Wastes in the warehouse must be removed as soon as possible. It is important that clean-up activities are carried out after each operation of warehouses, new operations are not carried out, and new cargoes are not affected by waste left from old cargos. The planned operation of this phase within the facility will contribute to cost improvements by reducing the cargo deterioration, damage and defect expenses of the air cargo operations while at the same time increasing customer satisfaction by increasing service quality.

-Standardization;
The only way for the complex processes of air cargo operations to continue without any hitches is that the processes take place within certain standard procedures. The standard procedures provide advantages for the staff, such as the lack of staff service differences, the progress of the processes on average at the same pace, and how the problems in the process can be easily resolved. Less problems in processes indicate that losses can be avoided and loss costs can be reduced.

-Discipline;
Kiazen 5S is the final phase of the management approach. In this phase, it is necessary to make the activities of the first four phases become habit by employees. This way goes without giving the employees a clear consciousness. From time to time, it is necessary to ensure that the personnel who create incompatibility within the structure are normally satisfied and that these personnel are re-adapted into the system. Disciplinary processes must be in every activity of air cargo operations which are complex.

While the Kaizen 5S management approach can be applied to warehouse areas as above, it is inevitable that it has its effect on the aircraft. After the warehouse activities, the cargo that is ready to be loaded must be taken into the airplane according to the loading style and positioned properly in the airplane. It should be classified according to cargo types in airplane, re-arranged in airplane, cargoes should be cleaned in airplanes before loading, and operations should be performed in accordance with standard procedures determined by top management.

3.2.6 16 MUDA Application and Leaving the Activities Out of System
Muda's goal is to identify all the losses such as labor, machinery, materials in the process system and thus remove them from the center. In order to be able to do this, basically sixteen categories are defined in three contents (https://www.industryforum.co.uk).

In the case of air cargo operations, cost reduction and cost minimization provide a large and significant effect of leaving the losses out of the system. For this reason, it is necessary to apply the muds which are determined as sixteen different types of losses in the three main categories of the costing process to air cargo operation. Air cargo operations can lose losses through:

-Losses of the connection;
1. Fault loss: The loss of equipment due to air cargo operation, or the loss of aircraft due to inadequate flight conditions during the operation. In order to avoid these losses, it is necessary to regularly carry out the maintenance and repair activities of the equipments used in the regular operation processes. Airborne maintenance procedures must be made mandatory in the frequencies and procedures determined by the competent authorities. In such losses, time is lost and new cargo reservations are not available and costs are increasing.

2. Loss of set-up and adjustment: Losses that occur during the switching of equipment during the transitions between operation processes. For example, when the labeling goes to the stacking stage, the expected time for the products to come into contact and the expected time for the control of the activities are lost. For this reason, the time lost due to these losses will cause the unit cost of the operator to increase. In order to eliminate these losses, if the preparation of each process is done before the end of the process in a process, elimination of the transition processes of the operations should be prevented.

3. Cutting blade change loss: The loss defined as the loss of cutting blade change for manufacturing operations is mainly caused by the parts of the equipment being used during the operation process and the loss caused by the failure of the wearer during operation. Replacement of such old-fashioned equipment parts at maintenance intervals will prevent losses in the operation process and prevent losses.

4. Start-up loss: A limited number of equipment is used in operations in air cargo operations. However, there may be some time loss to prepare these equipments. In terms of

prevention of these losses, equipment preparations should be prepared in a regular and planned manner according to the times of the operational processes.

5. Small downtime and idle loss: These types of losses are caused by a short interruption of the equipment during the operation, a short period of interruption of the process activities for any reason, while the operation is continuing. The losses are difficult to avoid. The ability to instantly intervene in equipment can prevent losses.

6. Loss of speed reduction: The average duration of air cargo operation until delivery of a cargo route to the intermediate carrier is the same. This type of loss is the loss of this employee due to the slowdown of the system. It is necessary to induce the regulatory effect by finding the cause of the decrease in the speed of operation as soon as possible.

7. Defects and loss of reprocessing: Damage, damage or deterioration of cargoes in the service process for air cargo operations is a significant loss. The cost of this loss is very negative in terms of cost. During the cost of Kaizen, it is necessary to take all kinds of precautions to prevent air cargo operation from causing damage to the cargo. Otherwise, the entity will have to meet the financial burdens in the agreement with the customers and will incur extra costs, which will cause the costs to increase.

8. Loss of closure: Routine maintenance, periodic maintenance, cleaning, statutory inspections, consequential losses in the operation of the equipment or aircraft used intentionally by the human power. This type of loss, which can lead to serious loss of time, increases unit costs by prolonging operation time by creating time loss. As a precautionary measure, the planning of the activities which will cause the shutdown of such equipment, in particular by the senior management, should be done at least when there is no concentration in the area where the operation is not carried out.

- Labor Losses;
9. Loss of Administration: Air cargo operations are not informed by senior management about the operation processes and have lost their lives because of lack of equipment and administrative activities. The purpose is to prevent the execution of authority and administrative activities. In this way, the lack of top management can be prevented at the bottom to affect the operational processes.

10. Loss of Movement: Losses caused by transportation time and fatigue of the workforce due to the remote location of the processes in the service areas of air cargo operation. Operation speed and attention sensitivity of the tired workforce will fall and both will increase the probability of making mistakes in the system, and will work slower to create a loss. In order to prevent this situation, it is necessary to arrange the warehouse areas and warehouse apron distance so as not to cause loss in the operation process.

11. Loss of Line Organization: Loss of work organization due to lack of training due to training, interruption or planning and subsequent intensive work due to air cargo operation. Due to fatigue factor, any problems that may arise in the line can be prevented by making the loss plan and making it impossible for this loss. In this case it is the responsibility of the senior management.

12. Dispatch Loss: One of the most significant losses that air cargo operations can encounter during the operation process. Losses are caused by delays and accidents in the operation processes in the event that air cargo is not picked up on time from the carrier. The avoidance is to schedule the transmission with the assumption that there may be delays with the purpose. For example, asking the carrier one day before the product's flight is like reporting delivery time as two days instead of one day.

13. Loss of Measurement and Adjustment: As a result of poor quality and lack of basic causes, the process is slowed down due to over-monitoring, and the resulting losses are the result of the loss of the process. Kaizen will effectively reduce the need for control in transferring the cost of knowledge to the workforce, and this kind of loss will come to an end.

-Lower, Energy and Team Loss;
14. Loss of Yield: Losses are caused by defects that occur for any reason other than the planned activities during air cargo transportation. Yield losses can have an adverse effect on the entire process and cause costs to rise. Emergency plans must be established to prevent such losses immediately.

15. Energy: All operations of air cargo operations are carried out with different types of energy. Exceeding the standard consumption figures in the use of these energies makes energy expenditure more conspicuous. Increasing energy costs will increase unit costs. For this reason, a business that will apply costly energy should use energy only at minimum levels and save energy as needed.

16. Mold, Tool and Jig Losses: Changes in the parts of the equipment are losses caused by changes in parts such as the wheel, loading system of the aircraft. These losses, which are difficult to avoid, must be kept at a minimum level.

Avoiding these sixteen losses to be experienced in air cargo operations, improvements in the enterprises will be provided and costs will be reduced by avoiding waste.

3.2.7. Adoption of Just-in-Time Service
Air cargo operations are obliged to give the estimated delivery time to the customers considering the operation times in accordance with the customer requests. This obligation is clearly defined in the contract between the air cargo operation and the customer. If the time limit is not met, the air cargo operation must meet certain compensation liability. The fact that the air cargo operation takes place at the time of disengagement from the operational processes indicates that the service delivery will occur on time. For this reason, air cargo operators should define a service mentality that can offset the time lost from operational disruptions. The realization of service processes in the context of Kaizen costing will be effective in achieving competitive advantage,

reducing costs and performing more operations by providing customer satisfaction.

3.2.8. Total Productive Maintenance

It can be applied as an extension of the lifetimes of both airplanes and equipments by applying continuous maintenance method to the equipment used by air cargo operations in airplanes and operation processes.

The fact that the depreciation costs of airplanes are so high is emerging as a factor that increases the costs of all airlines. However, doing more maintenance than standard maintenance procedures prolongs the lifetime and availability of aircraft. For this reason, a decrease in the depreciation costs may occur (Altınbay, 2006: 111–112).

In air cargo operations, frequent and continuous maintenance of equipment, not just airplanes, will prolong their life by reducing the chance of equipment malfunction during operation.

Kaizen is a significant cost item that needs to be focused on depreciation expenses for cost. For this reason, the application of total efficiency maintenance procedures plays an important role in reducing depreciation costs and minimizing costs.

3.2.9. Adoption of the Kaizen Suggestion System by Providing the Employees' Prior Participation

The Kaizen Suggestion system is a system that aims to generate ideas for every employee for continuous improvement. The implementation of every improvement idea is important for costly planning.

Employees in the business should produce improvement ideas according to their areas of expertise, these ideas should be assessed and taken into account, assessed for applicability, and investigated for improvement of the results.

Air Cargo operations should begin before the kaizen philosophy begins to apply costing to educate its employees. Kaizen must declare everyone's opinion so that the cost can be fully applied. The Kaizen suggestion system should be evaluated by the senior management in consideration of the suggestions made for the improvement of the person's area of expertise.

In air cargo operation, the captains are the most expert in matters such as fuel planning and flight time. In the same way, the load master is the person who can make the most efficient use of the capacitor in the load. As with these examples, the idea of captains in fuel improvements should be taken into account in the idea of load masters in loading.

In air cargo operations, many ideas will emerge to improve the quality of staff ideas. By selecting these ideas, cost advantages can be gained by providing improvements in the processes.

3.2.10. Poke-Yoke Application

In poka-yoke air cargo operations, the method that removes many faults that the human element can make is defined as equipment on the ground. It aims to achieve continuous improvement with the prevention of poka-yoke faults and aims to reduce the costs. Errors that occur during the operation process directly affect the quality of the product. In this case costs are increasing. Poka-yoke is an important component of costing in order to reduce costs and ensure continuous improvement. Many fundamental errors arise from the human factor in the operation processes of air cargo operations. Pokora should be avoided as a result of habits of some works, lack of sufficient knowledge about the work, mistakes made with awareness or carelessness, deliberate mistakes made for damage, etc (Shigeo, 1986: 310).

In air cargo operations, poka-yoke application can take place in three stages as in production enterprises. These steps;

-Interception Poka-yoke

It is a poka-yoke application that prevents the cargo operation from being affected by the error at the moment when the mistake that occurred during the operation processes is corrected. For example; such as improperly tagged cargo errors, correcting tags, and avoiding incorrect loads.

- Control Poka-yoke

It is the poka-yoke system in which the factors that are considered to be errors in the previous processes in the operations of the air cargo operations are prevented from being used in the next process. For example; Fueling a given route with a long route, but noticing a shorter route on the next flight

-Warning Poka -yoke

Provision of forward-looking corrections by letting the workforce in air cargo operation know the mistakes made. For example; It is like recapturing a staff who constantly makes mistakes in the process to the training process.

With these three poko-yoke applications, air cargo operations may be improved during the operation process. Continuous application of the poka-yoke method to prevent errors within the Kaizen area will provide continuous improvement.

Continuous improvements are the basic principle underlying the kaizen costing. Poka-yoke applications will also have an impact on reducing costs.

3.2.11. Measurement of Kaizen's Quality of Service and Its Impact on Mali

The implementation of the Kaizen costing is required to analyze the costs of the operator before the decision is made. This is necessary both to plan the kaizen costing and to measure how much the cost are reduced after kaizen costing has been applied. All improvements in the Kaizen costing process will both increase the quality of service and reduce the costs of air cargo operation. At this stage, measures should be taken about how to measure the effect on the system when the costing is applied and how to solve the problems in practice.

3.2.12. Continuous Improvement of Kaizen Activities and Improvement.

The word kaizen means continuous improvement as a word. Kaizen philosophy is to constantly make improvements in businesses where it is practiced. The goal of cost reduction is to reduce costs with continuous improvements. For this reason, the activities carried out for the realization of the improvements are required to be continuous. Air cargo operations are service businesses that have to repeat the same processes for each flight. Repeated costing activities to be applied to the operations of air cargo operations for each flight can help to reduce costs at desired rates.

4. Results and Suggestions

When we integrate Kaizen Costing processes into the processes of air cargo operations, determining the applications that will realize the target plans made in the first stage is the most important result of the study. For this reason, the target plan and the applications that can realize these plans are shown in the following table.

Table 4: Kaizen Costing Plan-Application Matching

Plans	*Targets*	*Applications*
Plan 1	Reduce flight operations and logistics costs	Kaizen Suggestion System
Plan 2	Determining Cost Objectives	Target Costing and Operating Costs
Plan 3	Plant Improvement	Kaizen 5S management approach
Plan 4	Reduce Direct and Indirect Personnel Costs	Kaizen Training Processes Poka-yoke
Plan 5	Reduce Depreciation and Lease Costs	Total Productive Maintenance
Plan 6	Reduction in Maintenance Costs, Advertisement Promotion Costs and General Administration Costs	Kaizen Suggestion System

The results we obtained by integrating the processes as a result of the interviews we made with the Turkish cargo authorities are as follows;

- A blueprint for the cost of air cargo operations has been planned with the integration of costly processes into the processes of air cargo operations.
- Air cargo operations are aiming to reduce costs by 10% with improvements, but they aim to improve costs by 6-8% in sectoral cases.
- It has emerged that Kaizen can be cost-effectively employed in air cargo operations through trainings in the workforce.
- It has been determined that air cargo operations can be divided into efficient work teams.
- Implementation of Kaizen 5S management has been determined to improve the unit costs by saving time in air cargo operations.
- With Kaizen 16 Muda method, it is revealed that many factors that cause loss in the system can be removed outside of the system and the costs can be reduced.
- It has been determined that the full-time production system adopted in manufacturing enterprises can be implemented as a just-in-time service philosophy in the air cargo operation in the light of costing, which will reduce costs.
- It has been discovered that the total productive maintenance from the Kaizen costing applications and the lifespan of the aircraft and equipment can be extended and the depreciation costs can be reduced.
- The Kaizen suggestion system has proven that every worker can adopt an operation and generate ideas for improvement, evaluate and implement ideas, and save money.
- It can be seen that the loss of labor caused by the poko-yoke system can prevent the loss of the work, and it can be seen that the costs arising from these losses can be eliminated.
- Improvement in terms of continuous improvement of these processes determined for air cargo operations will be continuous.
- Generally summarized, it has been revealed that the cost of air cargo operations will be reduced by 6-8% as the costs can be applied to the processes of the air cargo operations continuously and the improvements made are continuing continuously.

It is thought that the air cargo operations should be implemented in a cost-effective way as it is determined in the air cargo operation processes during the studies, but the application can not be realized because the air cargo operations can not take such a situation into consideration except for a radical change. This creates constraints on our work.

The process of application of the kaizen costing to the air cargo operations revealed by this study can be applied for a long time in the air cargo operations with the permits obtained from the top management of the air cargo operations and the net improvement rates can be measured by measuring the results.

References

[1] A. Colin, “Kaizen and the Art of Motorcycle Manufacture”, Engineer Management Journal, 80 (5), pp. 211–214, October 2001.
[2] A. Engin, “Kaizen Maliyetlemenin Maliyet Minimizasyonuna Etkisi: Bir Isıcam İşletmesinde Uygulama”, Yayımlanmamış Yükseklisans Tezi, Okan Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul, 2015.
[3] A. İsmail, “Maliyet Yönetimi Konusundaki Yeni Yaklaşımlar ve Muhasebe Eğitimi ve Uygulamalarına Yansımaları”, 14. Muhasebe Eğitim Sempozyumu, 2005.
[4] A. Ali, “Kaizen Maliyetleme Sistemi: Dinamik Bir Maliyet Yönetim Sistemi”, Afyon Kocatepe Üniversitesi, İ.İ.B.F. Dergisi, 8 (1), pp. 103–121, 2006.
[5] Ç. Metin & E. Murat, Uluslar arası Taşımacılık Yönetimi-Freight Forwerder El Kitabı **2**, İstanbul, Uluslararası Taşımacılık ve Lojistik Hizmetler Üretenler Derneği (UTİKAD), 2003.
[6] E. S. Aziz, Üretim ortamları Maliyet Yönetim Sistemleri İlişkisi ve Stratejik Maliyet Yönetimi, Türkmen Kitabevi, İstanbul , 2004.
[7] F. Patrick & Y. Keun-Hyo & K. Il Woon, “Japanese Target Costing: A Historical Perspective”, International

Journal of Strategies Cost Management, pp. 10-19, 2004.
[8] M. S. Alam & L. Li-bin & Y. Tian. & X. Sun, "Continuous Improvement Practices in Asian Developing Countries: A Comparative Analysis Between Chinese and Pakistani Manufacturing Industry", 14th International Conference on Management Science and Engineering (ICMSE), Harbin, PR China, pp. 692–697, 2007.
[9] M. Yasuhiro & J. Lee, "How A Japanese Auto Maker Reduces Costs", Management Accounting, August, 75 (2), pp. 22–26, 1993.
[10] P. S. Vincent, Inventory Management Kaizen, Proceedings of 2nd International Workshop on Engineering Management for Applied Technology, Austin, USA: IEEE, 2001.
[11] S. Michiharu, Integrated Cost Management: A Company wide Prescription for Higher Profits, Portland, Oregon: Productivity Press, 1996.
[12] S. Shingo, Zero Quality Control: Source Inspection and the Poka-Yoke System, Productivity Press, 1986.
[13] T. Zeynep, ''Geleceğin Maliyetlerinin Kontrolünde Yeni Bir Yaklaşım: Hedef ve Kaizen Maliyetleme'', Dokuz Eylül Üniversitesi İİBF Dergisi, 14 (1), pp. 199–214, 1999.
[14] Y. Fikriye, ''Hava Kargo Taşımacılığının Türkiye'deki Mevcut Durumu ve Geliştirilmesi İçin Yapılması Gerekenler'', Yayınlanmamış Yüksek Lisans Tezi, Anadolu Üniversitesi Sosyal Bilimler Enstitüsü, Eskişehir, 2012.
[15] Y. Monden & H. Kazuki., "Target Costing And Kaizen Costing In Japanese Automobile Companies", Journal of Management Accounting Research (JMAR), Vol: 3, Fall, pp. 16–34, 1991.
[16] Y. Süleyman, Yönetim Açısından Maliyet Muhasebesi (7. Baskı), Altın Nokta Basım Yayın, İzmir, 2011.
[17] Sivil Havacılık Genel Müdürlüğü (SHGM) 2017 Faaliyet Raporu, [Online]. Available: http://web.shgm.gov.tr/documents/sivilhavacilik/files/pdf/kurumsal/faaliyet/2017.pdf [Accessed: Sept. 26, 2018].
[18] http://www.turkishcargo.com.tr/tr/hakkimizda/kurumsal-bilgiler [Accessed: Feb. 02, 2018].
[19] https://www.industryforum.co.uk/wpcontent/uploads/sites/6/2015/05/The-16-Losses.pdf [Accessed: March. 02, 2018].

Author Profile

D. Macit received her Ph.D. in Economics from Istanbul University in 2018.

A. Macit received his master's degree in Aviation Management from Kocaeli University in 2018. He is currently working as an Academician at EGE University.