INFLUENCE OF FIRM RESOURCES ON PERFORMANCE OF SAFETY MANAGEMENT SYSTEM IN AVIATION INDUSTRY IN KENYA

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ABSTRACT

This study examined the influence of firm resources on performance of safety management system in aviation industry in Kenya. The study adopted a cross-sectional survey research design. The study used primary data collected from the aviation service providers using structured questionnaires. It also utilized secondary data collected from publications of aviation authorities such as KCAA, ICAO, FAA and IATA as well as from the respective services providers' journals and websites. The study involved a census of the managers in all the aviation service providers registered in Kenya. One hundred and thirty-two (132) questionnaires were distributed corresponding to the total number of organizations registered as aviation service providers under the Kenya Civil Aviation (Safety Management) Regulations, 2018. Prior to the actual study, a pilot study was conducted using twenty (20) questionnaires that were randomly distributed among the respondents and the results used to edit and modify the questionnaire. The data collected from the respondents during the actual study was analysed using both descriptive and inferential statistical methods. To achieve this, the data was coded, assigned labels to variables categories and entered into the computer. Qualitative responses were analyzed using content analysis. The descriptive technique involved generation of frequencies, mean and percentages while inferential analysis technique involved establishing significant linear relationship between the dependent variable and the independent variables. Pearson's correlation analysis and regression analysis was performed under the inferential analysis. The ANOVA F-statistic was used to test the research hypothesis for the regression coefficients for each variable. The data was presented in form of tables, graphs, and charts. Firm resources were seen to have a positive significant relationship with performance of safety management System in aviation industry in Kenya. There is need for the organization to strategically align it resource in order to improve the performance of safety management System in aviation industry in Kenya.

Keywords: Firm Resources, Performance of Safety Management System

BACKGROUND

Strategic firm level dimensions are exact functions of a particular business and are very important for any organizational activity or productivity of the company. The performance of an organization is enhanced by the combination of various strategic firm level dimensions. According to Aldag and Kuzuhara (2018), these dimensions are structures, systems and processes, style, staff, resources, shared values, strategy and strategic performance. Strategic firm level dimensions are usually associated to firm performance and these include firm resources (Yazdanfar, 2019).

There are two diverse opinions on what really influences performance. The first viewpoint is that it is actually strategic firm level dimensions that highly influence performance (Galbreath & Galvins, 2018) whereas the second point view is that industry characteristics are the ones influencing organization performance. Performance in a firm reflects the implementation of strategies that give competitive advantage over other firms. Decision making process of a firm relies heavily on its performances that determine the direction the firm can take in the future. Decisions may therefore be based on strategic firm level dimension such as firm resource (Robert Baum & Wally, 2017).

Firm's resources have been classified into six strategic resources that are physical, reputational, organizational, financial, human intellectual, and technological (Barney, 2011). Firm resources are the productive assets of firms, the means through which activities are accomplished. In the same manner, it also has been defined as stocks of available factors (knowledge, physical assets, human capital, and other tangible and intangible) that are owned or controlled by the firm, which are converted into final products or services efficiently and effectively (Barney, 2011). Tangible resources include capital, access to capital and location such as location of the buildings, warehouse and other facilities. Intangible resources consist of knowledge, skills and reputation, proactiveness, innovativeness and risk-seeking ability. Enhanced performance of

individual resource elements such as personnel, machinery and other fixed assets integrates into the performance of SMS (Chrisoplos *et al*., 2013). Benn, Edwards and Williams (2019) noted that in the contemporary highly competitive business environment where the value and importance of intellectual assets is important, the top management should be instructed to do excellent leadership practices.

Kenya being a member state of ICAO community is mandated to comply with the SMS implementation and operations (ICAO, 2019). Strategies employed by the organizations implementing and operating a new system will determine its performance (Safarova 2020). This study aimed at examining how firm resource influence performance of safety management system in aviation industry in Kenya. In New Zealand, Safarova (2020) studied on the factors that determine firm performance of New Zealand listed companies. Their results found that eight key factors were found to have the most impact on the operating performance of the companies in other markets. These factors are; intangibles resource, cultures, leadership, cash on hand, leverage, firm specific risk, growth and tangibility. The results have supported previous studies' findings to some extent, with resource and culture being the most important factor determining firm performance, followed by leadership with the weaker relationships. Other factors appeared to be marginally related to the operating performance at different significance levels.

Kariuki (2015) researched on firm level factors, industry environment, competitive strategy and performance of large manufacturing firms in Kenya. The study found that organizational resources influence organizational performance. This supports the resource-based view of strategy but the dynamic capability theory cannot be overlooked because it emphasizes on the importance of effective use of organizational resources. The study recommended that the management of large manufacturing firms should carefully make an

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objective assessment about the appropriateness of the organizational culture and effective utilization of resources.

As part of its mandate, KCAA certifies aircraft operators (e.g., commercial airlines like Air Kenya), aviation-training organizations (e.g., East African School of Aviation), aviation maintenance organizations (e.g., phoenix aviation) and airport operators like Kenya Airports Authority (KAA) which have to meet the requirements of the individual respective regulations. Among certified operators of aircraft in Kenya is the national carrier- Kenya Airways, incorporated in 1977 and has its head office in Nairobi. It is currently operating as public-private partnership venture with the Government of Kenya being the majority shareholder (29.8. %), followed by KLM which has a 26.73% stake in the company (Iteba & Wekesa, 2018). These organizations within the aviation industry are formally known as aviation service providers. They form the basis of this research and are as attached on Appendix V, VI, VII, VIII and IX.

Statement of the Problem

Aircraft accidents and incidents have persisted globally, regionally and more so in Kenya in spite of the introduction of safety management systems in the aviation industry. The European Union Aviation Safety Agency Annual Safety Review (2020) indicates that the numbers of non-fatal accidents and serious incidents in 2019 increased in comparison with the average of the previous 10-year period. According to the ICAO safety report (2020), the yearly accident statistics increased in 2019 with a 16 per cent increase in the total number of accidents (ICAO 2020). The trend is no better in Kenya as evidenced by the statistical analysis depicted on Appendix I and II. This is worrying not only for the safety of passengers but also for Kenya's economy and her bid to strengthen the grasp of the regional aviation hub in Nairobi. It is evident from the above reports that the SMS performance has not yielded enough positive results as aviation accidents and incidents are regularly occurring and audit gaps persist in subsequent

inspections. Appropriate implementation of SMS was envisaged to see a reduction of these numbers (ICAO 2019).

Successful managers understand the need for a sound business strategy and thus invest significant time, effort, and money in strategy development. Nevertheless, the real value of strategy can only be recognized through implementation; the ability to implement strategy is more important than the quality of the strategy itself (Martin, 2010). Holbeche (2015) avows that organizations find themselves in an execution trap i.e., the inability to execute a well-designed strategy. All organizations are therefore prompted to adopt Strategic firm level dimensions to ensure their survival and development of a competitive edge over their competitors. Effective implementation of safety management system ensures hazard identification and resolution as well as promoting continuous safety monitoring (Airport Council International, 2016).

Crichton *et al.* (2018) concentrated on the role of non-technical expertise and its effects on the performance of safety elements in aviation industry. In Kenya several studies have been undertaken in the aviation industry. Odhiambo and Kaibui (2016) revealed that stakeholder's involvement affected implementation of air safety projects at KCAA. Nyaga (2010) undertook a study on successful implementation of safety management system programs focusing on Kenya Civil Aviation Authority but left out other agencies as set by ICAO (2020). Due to contextual and managerial differences among organizations, issues gained from these previous studies may not be assumed to explain strategic firm level dimension at the aviation industry in Kenya. The studies do not also sufficiently address the subject of SMS performance as a strategy to minimize safety concerns in the industry. It leaves a gap that this researcher sought to fill by focusing on the influence of firm resources on performance of safety management system in aviation industry in Kenya.

Objectives of the Study

The objective of the study was to examine the influence of firm resources on performance of safety management system in aviation industry in Kenya. The study was guided by the following research hypotheses

- H_{01}: Firm resources have no significant relationship with the performance of safety management system in aviation industry in Kenya.

LITERATURE REVIEW

Theoretical Framework

The study was guided by resources-based theory on examining the influence of firm resources on performance of safety management system in aviation industry in Kenya.

Resource Based Theory

Resource Based-View (RBV) was developed by Penrose (1959) who suggested that a company should be considered as a collection of physical and human resources bound together in an organizational structure. Resource Based Theory states that a firm's performance is mainly driven by a unique set of resources that are valuable, rare and difficult to imitate (Singh & Mahmood, 2014). The theory suggests that each firm develops competencies from the firm resources to gain unique competitive advantage over other rivals (Abok *et al.,* 2013). Hafeez (2010) classified resources as physical assets and intellectual assets. Physical assets are easily distinguishable due to their tangible existence. Intellectual capital is relevant to the intangible aspect of human resource such as employee skill, knowledge and individual competencies (Hafeez 2010). Implementation of safety management system in an organization and success of its efficient operation could be a result of commitment of several resources. Therefore, it is on this background that this researcher wishes to link RBV theory with the variable of study in order to determine the influence of firm resources on the performance of safety management system in aviation industry in Kenya.

Conceptual Framework

According to Imenda (2014), a conceptual framework is a result of bringing together a number of related concepts to explain a given event and gives a wider understanding of the research problem. The conceptual framework used here summarizes the variables as applied in the literature review. The conceptual framework of this study shows the interaction between the dependent and independent variables. The conceptual Framework of the study is as depicted in Figure 1.
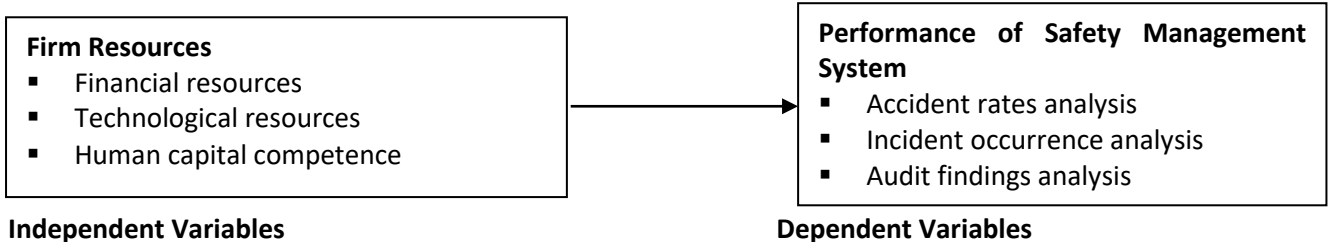
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┌─────────────────────────────┐            ┌─────────────────────────────┐
│ Firm Resources              │            │ Performance of Safety       │
│  ▪ Financial resources      │  ────────▶ │ Management System           │
│  ▪ Technological resources  │            │  ▪ Accident rates analysis  │
│  ▪ Human capital competence │            │  ▪ Incident occurrence      │
│                             │            │    analysis                 │
│                             │            │  ▪ Audit findings analysis  │
└─────────────────────────────┘            └─────────────────────────────┘
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Independent Variables   **Dependent Variables**

Figure 1: Conceptual Framework

Firm Resources

Lewis (2013) describes firm resources as assets available to a firm to use during the production process. These may be human resources, financial resources, material resources, technological resources, physical resources, and information resources. Resources are the basis of organizations' power and dominance over their competitors. Survival of an organization relies on its ability to acquire and retain resources. Organizations' survival in the competitive business environment therefore relies on their ability to efficiently utilize resources and have adequate human skills for coordination (Barney, 2011). Hoffer and Schendel (2015) asserted that a firm's resources include all assets, capabilities, processes, firm attributes, information

and knowledge under its control. Resources enable a firm to conceive and implement strategies that improve its performance.

Performance of Safety Management System

According to ICAO (2021), safety management system is a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures. Johal (2015) observed that ICAO safety management system framework conform to the Plan-Do-Check-Act cycle because it ensures process control and continuous safety improvement. The aviation industry adopted the use of SMS concept which had been developed by industries such as petrochemical, nuclear, occupational health and construction in the aftermath of a number of disasters that led to enactment of safety management legislation especially in Europe (Stolzer *et al.*, 2015; Hudson, n.d). ICAO (2020) dictates that the SMS framework at a minimum shall be established in accordance with the four component pillars of safety management. According to ICAO (2020), these pillars include safety policy, risk management, assurance and safety promotion. The four elements are incorporated in an organization's structures to the extent that is proportionate to the size and complexity of the organization in hand (ICAO, 2020; Arendt & Adamski, 2017).

METHODOLOGY

A positivistic approach was used in this study and is concerned with testing hypotheses, structured research design and objective method using cross-sectional design. This study adopted a cross sectional survey research design that allows the researcher to collect a wide range of information without interfering with the environment since nothing is manipulated. This, therefore, enables a researcher to obtain large amounts of data from a sizeable population in a highly effective, easy and in an economical way using questionnaires.

The population for this study comprised of all the aviation service providers in Kenya that have been mandated by ICAO to implement safety management system in their organisations as described at the scope section of this proposal. ICAO categorizes the aviation industry into aviation service providers. In Kenya, the service providers were as follows: Air Traffic Services, Approved Maintenance Organizations, Approved Training Organizations, International Aircraft Operators (usually referred to as international airlines), and Operators of Certified Aerodromes. ICAO has prescribed designated heads of safety as the responsible persons in charge of implementation of safety management system in these organisations. The target population for the study was the managers of these aviation service providers in Kenya.

Table 1: Aviation Service Providers in Kenya

Organization	Number Operating in Kenya
ATS Providers (KCAA Manned Airports)	9
Approved Training Organizations	19
Certified Operators of Aerodrome	12
Approved Maintenance Organizations	50
International Commercial Aircraft Operators	42

Source: KCAA, 2019

The sampling frame for this study was the managers in the aviation service providers detailed in Table 1. To come up with an appropriate study sample, the study utilized stratified sampling technique and more specifically proportionate stratified random sampling. The population was grouped into five strata representing each category of the services provider. A census of all managers in the five categories of service providers was carried out. Table 2 shows the sampling technique and sample size.

Table 2: Sampling Technique and Sample Size

Organization	Number Operating in Kenya	Respondents (Heads of Safety)
ATS Providers	9	9
Approved Training Organizations	19	19
Certified Operators of Aerodrome	12	12
Approved Maintenance Organizations	50	50
International Aircraft Operators	42	42
Total	**132**	**132**

Both primary and secondary data was collected. Primary data was collected using questionnaire whereas information in journals and periodicals was collected from libraries as secondary data. The researcher used questionnaires with both close-ended and open-ended questions where the respondents were required to explain briefly. Secondary data was used to assess the performance of safety management system in the organizations.

Questionnaires were self-administered to the 132 respondents. Heads of safety are considered knowledgeable about the performance of the safety management system in their respective organizations. To ensure maximum response, the organizations were first contacted and adequately informed about the intended data collection exercise. The questionnaires were then emailed to the respondents. Secondary data was obtained from the KCAA library, ICAO records and respective organization journals, websites, periodicals among other reliable sources. The study carried out a pilot test to test the validity and reliability of the questionnaires in gathering the data required for purposes of the study.

The study gathered both qualitative and quantitative data. Descriptive statistics such as mean, standard deviation, frequency and percentages was used in analysing quantitative data (Kothari & Garg, 2014). On the other hand, qualitative data was analysed using content analysis. The data was presented using frequency, tables and bar graphs. To enhance data handling, Statistical Package for Social Sciences version 25 was used due to its ability to handle both small and voluminous data (Dempsey, 2013). Inferential statistics were also carried out to establish the nature of the relationship that exists between variables.

A linear regression model was used in the analysis to determine the relationship between the independent variables and the performance of SMS in aviation industry in Kenya.

$Y = α + β_1X_1 + ε$ …………………………………

Where Y is Performance of SMS, $α$ is the Y intercepts, $β_1$ is Coefficients of Regression and $ε$ is the error term of the model.

$X_1 =$ Firm Resources

FINDINGS AND DISCUSSIONS

The study selected a sample of 132 heads of safety from aviation service providers in Kenya. All selected respondents were issued with questionnaires for data collection, but the researcher was able to receive back only 123 questionnaires. The returned questionnaires formed a response rate of 93.2%. According to Mugenda and Mugenda (2013), a response rate of 50% and above is good for analysis and reporting, that of 60% is sufficient while 70% and above is excellent. Therefore, since our response rate was above 70% it was considered to be excellent and was used for further analysis and reporting.

Descriptive Statistics

Respondents gave their opinion on various statements relating with firm level resources. The findings obtained were as presented in Table 3.

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Table 3: Firm Resources

Statement	Mean	SD
Our organisation has sufficient allocation of financial resources during budgeting process for SMS activities	3.797	1.240
The SMS department is consulted and involved in the determination of the budgetary allocation of financial resources for SMS activities	3.976	1.125
Organisation has adequate technological facilities and working tools to support SMS activities	3.927	1.546
Our organization has elaborate knowledge application technologies within the SMS department	3.732	1.264
Our organization has qualified personnel to execute SMS tasks as mandated.	3.846	1.428
Our SMS department is sufficiently staffed to execute its SMS mandate	3.854	1.158

The results presented in Table 3 show that the standard deviation for each of the statement was less than two (small standard deviation) an indication that respondent's individual responses was in agreement with mean. The findings specifically show that the respondents agreed that the SMS department is consulted and involved in the determination of the budgetary allocation of financial resources for SMS activities (M=3.976, SD=1.125); their organisation has adequate technological facilities and working tools to support SMS activities (M=3.927, SD=1.546); their SMS department is sufficiently staffed to execute it's SMS mandate (M=3.854, SD=1.158); Their organization has qualified personnel to execute SMS tasks as mandated, (M=3.846, SD=1.428); their organisation has sufficient allocation of financial resources during budgeting process for SMS activities (M=3.797, Std. Dev=1.240; and their organization has elaborate knowledge application technologies within the SMS department (M=3.732, Std. Dev=1.264). The study findings agree with

Abok, Gakure, Waititu and Ragui (2013) that organizations with a supportive environment and available resources were successful in incorporating culture that stimulated teamwork spirit, togetherness, and willingness to share and implement organisation goals. The findings are also in line with Nkosi (2015) that lack of adequate financial resources was a significant challenge in strategy implementation. Further, the study concurs with Sorooshian *et al*. (2010) who observed that the significance of human resource in strategy implementation is based on the idea that people management can be an essential source of sustained competitive advantage of a firm. Therefore, a strong human resource component is required for proper implementation of strategies and better performance in an organization.

Performance of SMS

Respondents gave the level to which they agreed or disagreed with various statements on performance of safety management system. Table 4 presents the findings obtained.

Table 4: Performance of SMS

Statement	Mean	SD
Organizational culture influences the performance of safety management system in the organization	3.961	1.149
Capacity building influences the performance of safety management system in the organization	3.955	1.199
Firm resources influence the performance of safety management system in the organization	3.902	1.345
Strategic leadership influences the performance of safety management system in the organization	3.836	1.207
Stakeholders' collaboration has a moderating effect on the relationship between firm level dimensions and performance of safety management system in the organization	3.836	1.234

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Results in Table 4 showed that the standard deviation values for each of the statement are less than two; this suggests that respondent individual responses did not differ from the mean. The findings further show that the respondents agreed that organizational culture influences the performance of safety management system in the organization (M=3.961, SD=1.149), capacity building influences the performance of safety management system in the organization (M=3.955, SD=1.199), firm resources influence the performance of safety management system in the organization (M=3.902, SD=1.345), strategic leadership influences the performance of safety management system in the organization (M=3.836, SD=1.207) and stakeholders' collaboration has a moderating effect on the relationship between firm level dimensions and performance of safety management system in the organization (M=3.836, SD=1.234). The study findings agree with Noble performance framework (2011) that identified that communication is important because the details of performance effort need communication as early and as clearly as possible, while incentives are important to inspire and motivate members to change in accordance with the new strategy. It also agrees with Lares-Mankki (2014) who studied on strategy implementation bottlenecks and revealed that, failure in implementation of strategic plans was due to poor and inadequate information sharing with uncertain responsibility and accountability.

Inferential Statistics

Relationship between study variables was determined by computing inferential statistics. The study computed correlation and regression analysis.

Correlation Analysis

The study computed correlation analysis to test the relationship between the dependent and the independent variables. Pearson R correlation was used to measure strength and the direction of linear relationship between variables. The association was considered to be small if $\pm0.1 < r < \pm0.29$; medium if $\pm0.3 < r < \pm0.49$; and strong if $r > \pm0.5$.

Table 5: Correlations

		Performance of SMS	Firm Resources
Performance of SMS	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	123	
Firm Resources	Pearson Correlation	.688[**]	1
	Sig. (2-tailed)	.001	
	N	123	123

From the findings, the relationship between the dependent variable and the independent variables were all significant (p-values<0.05). The findings also show that there was no significant relationship between the independent variables and therefore implying that there was no multicollinearity between the variables. The findings show that firm resources is seen to have a strong positive and significant relationship with performance of safety management system (r=0.688, p=0.001). These findings show that there is significant relationship between the dependent and independent variables, i.e., firm resources have significant influence on performance of safety management system in aviation industry in Kenya. The study findings agree with Mtolkwa (2017) that the success of safety management system in Kenya lies in how organizations balance the scarce resources between provision of services and protection in conformity with international standards and that the challenge facing full implementation of SMS range from inadequate resources to unsupportive organizational structures.

Regression Analysis

This form of regression allowed the researcher to analyse a single dependent variable Y and the K

other variables that are suspected to influence Y. Simple regression model of the form $Y = \beta_0 + \beta_i X_i$ was adopted.

Firm Resources and Performance of Safety Management System

The objective of this study was to find out the relationship between firm resources and performance of safety management system in aviation industry in Kenya. This objective was answered by conducting simple regression of firm resources and performance of safety management system. The findings obtained were as presented in Table 6.

Table 6: Simple Regression for Firm Resources

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.688[a]	.473	.469	5.00007
a. Predictors: (Constant), Firm Resources				

ANOVA					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	272.839	1	272.839	10.913	.001[b]
1 Residual	3025.079	121	25.001		
Total	3297.919	122			
a. Dependent Variable: Performance of SMS					
b. Predictors: (Constant), Firm Resources					

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.702	.393		4.331	.000
Firm Resources	.304	.092	.688	3.304	.001
a. Dependent Variable: Performance of SMS					

Results in Table 6 on model summary show that the value of adjusted R^2 was 0.469; this implies that 46.9% of variations in performance of safety management system can be attributed to changes in firm resources. The remaining 53.1% variations in performance of safety management system can be attributed to other factors other than firm resources. The findings also show that firm resources and performance of safety management system are strongly and positively related as indicated by a correlation coefficient (R) value of 0.688. The study findings are in line with the findings of Gachua and Mbugua (2016) that implementation of strategies was highly influenced by management commitment and availability of resources for strategic decision-making.

The Anova findings show that the p-value obtained was 0.001 which is less than 0.05, an indication that the model was significant. The findings also show that the f-calculated value (10.913) is greater than the F-critical value ($F_{1,121}=3.919$). Since the f-calculated value is greater than the f-critical value it shows that the model is reliable and can be used to predict performance of safety management system in aviation industry in Kenya. This concurs with Lewis (2013) that resources are the basis of organizations' power and dominance over their competitors; Resources enable a firm to conceive and implement strategies that improve its performance.

From the coefficients table, the following model was fitted;

$Y = 1.702 + 0.304\ X_1 + \varepsilon$

From the equation above, when firm resources are held to a constant zero, performance of safety management system will be at a constant value of 1.702. The findings also show that a unit increase in firm resources will lead to a 0.304 unit increase in performance of safety management system. The

findings also show that the t-statistic (3.304) has a p-value (0.001) which is less than the selected level of significance (0.05). Therefore, we accept the null hypothesis (H_{01}) and conclude that firm resources have significant relationship with the performance of safety management system in aviation industry in Kenya. This finding agrees with Lynch (2012) that organizations with resources that are inimitable, rare, non-substitutable and valuable qualities have a competitive advantage over other organizations in the same industry; and hence, survival of an organization relies on the organization's ability to acquire and retain resources for other actors in the environment.

CONCLUSIONS AND RECOMMENDATIONS

The study established that firm resources have a positive influence on performance of safety management system. Also, the influence was found to be significant. This implied that increase in firm resources results to an increase in performance of safety management system. Based on study findings, the study concluded that firm resources have significant relationship with the performance of safety management system in aviation industry in Kenya.

Firm resources were seen to have a positive significant relationship with performance of safety management System in aviation industry in Kenya. Human resource is a very important resource in an organization that allows attaining of competitive advantage; the study thus recommends organisations to embrace better Human Resource management practices that build a strong asset in form of people. Companies should identify and examine their strategic advantages based on their discrete combination of assets, skills, capabilities and intangibles as an entity. Companies should develop competencies from the firm level resources to gain unique competitive advantage over their rivals.

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