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A review of Inventory Management System in the South African Aerospace Industry

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Abstract

Inventory management system that aims at managing, controlling and storing of the spare parts is a cost driver for aerospace equipment in operating and maintaining those equipment. During those breakdowns, maintenance personnel spent too much time trying to find and acquire replacement parts. Requisition volume depends on instinctive feel and past experiences, with some casual meeting with the maintenance technicians manufacturing designers and specialists. Consequently, the concept of inventory management systems has become a buzz word amongst the scholar and industry practitioners. Despite the fact that, the concept of inventory management system in aerospace is attending higher level of significance within the western countries, America and Asia due to its ability of smoothing the business environment, in Africa, particularly in south Africa, the integration and adoption of inventory management system in aerospace is facing several challenges. To date, over the past decades a huge number of studies have been conducted with the aim of investigating the benefit of inventory management implementation in manufacturing as well as Aerospace industry at global level. However, very few studies have been conducted from South African aerospace industry level. Hence, the overall goal of this paper is to fill this gap by means of critically analyzing studies that were developed various inventory management frameworks over the past decade.

Keywords: Inventory Management, Aerospace, South Africa

1.1 INTRODUCTION

It originates from this military retained history that there is a solid legislative motivation on the aerospace research business and a solid connection amongst industry and the government. The government of South African is resolved to construct the nation's aerospace and to make it globally consolidated and focused. The national mechanical strategy respects global organization of one of the instruments to energize improvement in a commonly gainful and practical way. The fundamental innovations that the government has perceived are advanced electronics, advanced light materials and production technologies. It is found to be such a big fight for every single aerospace organization to get the most out of on its equipment utilization whilst also increasing the equipment operations and flexibility. Making sure that the aerospace equipment is functioning, operational and delivering at ideal capacity is critical, as well as managing and controlling maintenance processes have a direct influence on the running costs, service levels and then profitability. To exceptionally support aerospace equipment manufacturing facility maintenance and production, it is vital to have appropriate inventory management for the maintenance and repair of the equipment available when needed. The term inventory incorporates material like raw materials, in process, got done with bundling, spares and others, loaded keeping in mind the end goal to take care of an unpredicted demand or conveyance later on. Safe stock recommend to the parts essentials for keeping required asset in strong working condition by meeting repair and maintenance necessities caused by breakdowns and preventive maintenance. There is a time when both service and equipment management are enhanced so they wind up achievable destinations. Bharadwaj, Silberschmidt and Wintle

(2011) pointed out that inventories used on equipment maintenance are predominantly impacted by equipment support arrangements. Planned maintenance always had respectably expectable interest for extras and it surely is conceivable to arrange parts arrival in the nick of time for utilization.

To operate any aerospace equipment, plant operators need accurate information combined with the ability to act quickly in response to impeding emergency breakdowns. But from time to time, the organization is facing an increased down time of the wind tunnels, higher repair costs, immediate equipment spare parts unavailability and too many obsolescence due to the ageing of the facilities and financial losses. Finance and plant managers will generally provide for the purchase of the material or parts necessary to keep the wind tunnel facility running in order to maintain production levels. However, availability does not have to mean on the shelf, and when needed does not necessarily imply the right way. In the aerospace equipment facilities, unprepared maintenance activities because of emergency breakdowns and the nonexistence of accessible parts effect on-going hardships and furthermore the extra charge of acquiring the parts or inventories at a short period of time. Most of aerospace companies have old complex equipment. Managing complex equipment spare parts is quiet a big challenge, especially if you have several different types of subsystem whereby each need its unique set of parts required for both planned and unexpected preventative maintenance. As the aerospace equipment ages, the cost of maintaining, upgrading and repairing existing equipment increases. The legacy equipment is not easy to replace. The main reasons for this maintenance increased costs being the lacks of immediate availability of spare parts of this legacy equipment from original equipment manufacturers (OEMs) and original equipment which in many cases do not existing anymore. This study will review inventory management of South African aerospace industry.

1.2 BACKGROUND

The term inventory incorporates raw material, in process, got done with bundling, spares and others, loaded keeping in mind the end goal to take care of an unpredicted demand or distribution later on. Safe stock recommend to the parts essentials for keeping required asset in strong working condition by meeting repair and maintenance necessities caused by breakdowns and preventive maintenance. There is a time when both service and equipment management are improved so they wind up achievable destinations. Bharadwaj, Silberschmidt and Wintle (2011) pointed out that inventories used on equipment maintenance are predominantly impacted by equipment support arrangements. Planned maintenance always had adequately expectable interest for extras and it surely is conceivable to arrange parts arrival in the nick of time for utilization. Aerospace equipment facilities plays a big role in networking the major centers both nationally and internationally. To operate this world class equipment, plant operators need accurate information combined with the ability to act quickly in response to impeding emergency breakdowns. But from time to time, the organization is facing an increased down time of the wind tunnels, higher repair costs, immediate equipment spare parts unavailability and too many obsolescence due to the ageing of the facilities and financial losses. Finance and plant managers will generally provide for the purchase of the material or parts necessary to keep the wind tunnel facility running in order to maintain production levels. However, availability does not have to mean on the shelf, and when needed does not necessarily imply the right way.

1.3 INVENTORY MANAGEMENT

When we look back in the history of the Christianity, inventory management was first thought up by Noah when he counted and add up the clean and unclean beasts and creatures for the Ark. But for briefness sake, we will jump forward to the up-to-date times. The word inventory comes from the French word “Inventaire” and Latin word “Inventariom”, which proposes a list of things found. The word inventory comprises material like raw, in process, completed packaging, replacements and others, kept in order to encounter an unforeseen demand or supply in the future. Another definition of Inventory is the materials whenever required by acquiring adequate number and kind of inventories. This procedure usually comprises of controlling the transfer of the components in order to avoid the inventory from becoming too large, or decreasing to levels that could put the process or operation of a business into jeopardy. Inventory Management is also defined as all the events needed for the procurement, storage, sales, clearance or dispatch or materials usage. Inventory managers have to stock up when required and efficiently use available storage space, in order to have the storage space not surpassed. In addition, three more definitions are chosen are suitable for the research. Ballou (2004) characterizes inventories as a combination of raw materials, suppliers, parts and completed products that show up at various focuses throughout the organization’s logistic systems. As described by Aquilano, Chase and Jacobs (2006), the inventory is the items or stock of all the element or possessions utilized in any organization and they further explained the inventory system as the arrangement of approaches and the controls that

observes the amount of inventory and regulate whatever amount of inventory have to be preserved, when inventories have to be replaced and how bulky orders should be handled. Inventory Management, as characterized by Chase (2008), is the "administration of the supply of anything or asset utilized as a part of any organization". Following on this explanation, the inventory management system is the course of action of methodologies and controls used to ensure sensible levels of inventories. Inventory management is worried about setting the right stock levels, selecting demand regularities and showing immaculate demand sizes. He furthermore characterized the term 'supply' as the degree at which stock or spare part is restocked and the term 'request' as the degree at which stock is drained. Stock along these lines goes about as the boundary between the supply and the request rate.

2 CRITICAL ANALYSIS OF CURRENT LITERATURES

To begin with the critical assessment of the literature review on the effectiveness of the inventory management system in aerospace, final total combination journals and articles and publications from both small medium enterprises and large organizations were well-thought-out to be satisfactory for the devotions of this research. The greatest essential period in this collected works retrieval procedure was a computer search of the ISI Web of Science Database. The exploration period included the current decade from January 1997 to 2017. The searched only focused on peer reviewed articles published in English, by means of the descriptor ‘‘manufacturing inventory management’’ in the heading of each article, just about 1300 summaries were retrieved for evaluation from the stated era. A guided manual search was then piloted for manufacturing in automotive, mining, food, aerospace and few other since inventory management in these sectors is very critical and common and they also are the key sectors in the global economy growth. Each publication retrieved over this process was wisely studied before a choice was made on its inclusion in the literature review. The researcher required that all articles debates the inventory management system in manufacturing industry. This necessity excluded numerous journals retrieved from the database, as the descriptor that was used produced summaries from several publications that did not automatically define the inventory management system. And that is how only 15 publications were reviewed. Precisely, articles assessed in this study are clearly focused on inventory management system in aerospace. It should be pointed out that studies that did not meet this requirement were not taken into account. The cataloguing of most of the grouping of the articles was fairly modest and direct, by means of the exclusion of most research area and resource type. As individual publication was studied, it was categorized according to the following groups: Publication year, Country of research, Number of citations of the publication, Research Area and Research Source type.

To this end the table 1 below shows the 15 best studies that were conducted over the past two decades in the field of inventory management in wind tunnels.

REFERENCES	**STUDY INFORMATION**		**MANUFACTURING**					**STUDY METHODOLOGY**	
Author publication year	**Region**	**Firm Size**	**Food**	**Mining**	**Automotive**	**Aerospace**	**Other**	**Qual**	**Quant**
Fore and Msipha (2010)	Zimbabwe	Large		×				×	
Wong and Lai (2011)	China	Large					×		×
Jain, Groenevelt and Rudi (2011)	India	Large	×						×
Hsueh (2011)	Taiwan	Large	×						×
Kleber, Rainer; Schulz, Tobias; Voigt, Guido (2012)	Germany	Large			×				×
Chan and Prakash (2012)	China	Large			×			×	
Shankar Morkos and Summers (2012)	USA	Large			×			×	×
Shan and Zhu (2013)	China	Large					×		×

Khaled and Wahba (2013)	Egypt	Small					×		×
Cheng, Li, Chu, Yeh and Simmons (2013)	Taiwan	Large				×			×
Thome, Scavarda, Pires, Ceryno and Klingebiel (2014)	Brazil	Large			×			×	
Jiang Chen and Zhou (2015)	China	Large				×		×	
Wang, Tian, Hua, Zhu, Gao Xue, Hao, Wang and Zhou (2016)	China	Large		×					×
Cashman, Meyer, Edelen, Ingwersen, Abraham, Barrett, Gonzalez, Randall, Ruiz-Mercado, and Smith (2016)	USA	Large		×					×
Mathu, K.; Tlare, M. T. (2017)	South Africa	SME					×		×

Table 1: Publications' Critical Assessment table

Fore and Msipha (2010) did some researches about the preventive maintenance using reliability centered maintenance in a ferrochrome manufacturing company. High production in manufacturing involves high equipment dependability and plant readiness. The purpose of this article is to demonstrate the administration of preventive maintenance by use of the Reliability Centered Maintenance (RCM), steering at ferrochrome processing plant. They pointed out in their research that preventive maintenance is over and over again abandoned, distressing process stability, and thus compromising product quality because of the drops and instabilities in operating temperature. They revealed that the equipment failures have a tendency to be recurrent and longer, consequently affecting production objectives. Start-up failures are also experienced after conducting maintenance and also that the maintenance division is affected by the unpredictability of the equipment's operational arrays, and faces trials in coming up with an operative spare part inventory management administration. This points to disaster management, thus accumulating the direct cost of maintenance. They suggested that RCM be utilized to form a cost-effective preventive maintenance approach to report the leading reasons of equipment failure. The qualitative research method was piloted in a form of model comparisons and the interviews. The study results also displayed that the plant spares inventory is disordered, there are typically costs related with purchasing spares in an urgency and the maintenance or spare parts inventory is not well-ordered. This is regularly exposed by the absence of spares when necessary. Although this significant research in the large mining industry seems logical, it is felt that the authors focused more on the spare parts inventory, which is a good thing and not addressing the importance of the products storage, lead times and the capacity which forms part of the most crucial characteristics of the inventory management. This research is only aimed at mining companies.

The research, An investigation of the application of fuzzy set of philosophies in production and operations management by Wong and Lai (2011) aims to classify the research tendencies in and publication openings for the applications of the uncertain set models method in production and operations management. Their key discoveries indicated that:

- The greatest general applications are size planning, forecasting, inventory control, and product design.
- Some application regions make added use of specific kinds of fuzzy methods.
- The fraction of applications that speaks to mi/unstructured kinds of production and operations management difficulties is growing.
- The most general technologies combined with the fuzzy set concept method are hereditary/evolutionary set of rules and neural systems.
- And the greatest common improvement instrument is C Language and its extension.

The researchers' assessment settles numerous investigation tendencies, some of which are unpredicted and some of which challenge former discoveries. Although this significant study was conducted, the researchers' main concentration was on the past developments in fuzzy set philosophy research in production and operations management application zones, and do not analyse how fuzzy set theory could be functional in dissimilar types of inventory management applications. The study did not show in-depth understanding of how fuzzy set theory to

advance proficiency and efficiency in various inventory management zones, and also did not show the exploration of the promising role that fuzzy set theory might play in inventory management applications. The study was just is for general manufacturing industry in china and nothing about the aerospace inventory management system was addressed.

The study Periodic Review Inventory Management with Contingent Use of Two Freight Modes with Fixed Costs by Jain, Groenevelt and Rudi (2011), investigated a stochastic inventory ideal of arm that sources the product from a make-to-order manufacturer, and can ship orders by a mixture of dual goods in transit means. The researcher revealed that dual shipping approaches vary in lead-times, and each has axed and a quantity proportional cost for every use. They further emphasized that ordering decisions are made periodically; however, the inventory carrying and back-order fine charges are sustained endlessly in time. They used data about demand for the duration of the accomplishment of manufacturing to decide on how to assign units between the two shipping methods. By carrying-out an extensive numerical quantitative research, they derived the ideal shipping method distribution policy and demonstration that the ideal ordering policy is not an (s;S) policy in overall. The researchers provided restrictions for the ideal policy and perform a stationary analysis of the model assuming an (s;S) policy. They further showed that the best (s;S) policy achieves time ordinary likelihood of being in-stock equivalent to the percentage of fine cost amount and the totality of penalty cost rate and carrying cost rate. In this significant research, the main focus was existence of big economies of gauge in shipping prices as compared to ordering cost, it is logical to trust mainly on the inexpensive shipping method and use the other under extreme conditions. This is also for food manufacturing and transportation companies. None of the issues encountered in the South African aerospace industry inventory management or aerospace industry inventory management were addressed.

Hsueh (2011) conducted the research in the inventory control model with attention to remanufacturing and product life cycle. The researchers investigated the inventory control policies in a manufacturing/remanufacturing system throughout the product life cycle, which comprises of four stages: starter, development, prime of life, and deterioration. From the qualitative research conducted, it showed that both request amount and profit amount of products are casual variables with standard delivery and the mean of the distribution differs according to the time in the product life cycle. They further derived closed-form methods of ideal production lot size, reorder point, and safety stock in each stage of the product life cycle. Although the results displays that unlike inventory control policies should be embraced in different stages of the product life sequence. It is also discovered that the ideal production lot size and reorder point are not delicate to the stage size and the request varying frequency. Even though this article examined several concerns with respect to the Taiwan general manufacturing companies' situations, the authors dealt with only product life cycle and the specific inventory management aspects, especially aerospace industry inventory management system, are hardly been dealt with in a literature.

Dynamic buy-back for product recovery in end-of-life spare parts procurement by Kleber et al (2012) investigated the well-organized supply of spare parts is of major worry for OEM. They indicated that even though manufacturing the main product, spare parts can be track down proficiently by means of present manufacturing plants, this circumstances totally changes as soon as the OEM concludes production of the main product. In totalling the findings, they revealed that old-fashioned spare parts sources are in the arrangement of concluding order and remanufacturing and the alternatives to purchase back parts or products that make available a feasible alternative in the end-of-life stage. However this can inhibit the OEM from satisfying their spare parts ease of use responsibility or rise their capability to remanufacture. They further showed the current practice in industry being to propose trade-in operations to obtain practical products from clients by offering significant mark-downs on a new-generation product. Through the results from their quantitative research, they suggest the thought of a third alternative which is to purchase back damaged products with the intention of expanding control of both request for spare parts and distribution of recoverable parts. As much as this study is performed on spare parts inventory, the main focus was only on the assessment of the possible advantage of buy-back approaches in contrast to both old-fashioned sourcing and trade-in promotions for changed settings concerning data accessibility and buy-back flexibility in the large automotive parts original equipment manufacturer. Other inventory management of other industries like aerospace are not addressed and dealt with.

A simulation study of Inventory management in an adjacent collective manufacturing supply chain was conducted by Chan and Prakash (2012). The researchers used the qualitative method of comparing the two models to examine manufacturing supply chain partnership on the foundation of carrying cost, backorder cost and ordering cost. The categories of partnership scrutinised are perpendicular, parallel and adjacent partnership. This investigation highlights adjacent partnership by defining the influence of inventory policies ((s, S) and (s, Q) inventory policies) on supply

chain performance. For better understanding, a theoretical prototypical is delivered that is sustained by an arithmetical specimen. The researchers used a simulation approach to display the influence of adjacent partnership on performance events for instance the overall cost, which is the summation of numerous cost components: inventory carrying cost, backorder cost and ordering cost. This investigation is constructed on dual manufacturing supply chains where the manufacturer is occupied as the joint knot where a separation study on every cost component was conducted. This study was focused on general manufacturing supply chain even though little components such as shipping cost, lead time, and shipping time can be well-thought-out. Some vital but elusive characteristics such as confidence, senior management obligation, tractability, fellowship, and tolerance should also be taken into consideration. The researchers did not address the specific manufacturing factor of aerospace industry inventory management in their work but only a linear supply chain has been considered.

In their study, Reasons for change propagation in an automotive OEM, Shankar et al (2012) identified the motives for the variations by means of archival examination through which it is found that 77.0 % of changes are due to interior motives while 23.0 % are external motives. They revealed that these variations are classified into origin, and circulated variations using a matrix-based modelling tactic from which the motives for circulation are acknowledged. It is indirect that 32.4 % of the total variations are due to circulated variations such as inventory concerns, manufacturing concerns, and design fault alteration. The bulk of motives for these circulated changes consist of document fault alteration such as bill of material fault, drawing fault, incorrect outline date in engineering change memo, and design fault rectification for instance design restrictions. The case study research, which indicated that both qualitative and measureable research approaches were used, was piloted on an OEM that was nominated by means of the benchmarks of the precise product manufactured, which are complex large road vehicles needing a great amount of product customization. The outcomes show almost one-third of time consumed by the engineers can be lessened by developing suitable controls in the course of the change discharge process. This research emphases on identifying the motives for change circulation throughout the production period of the product life cycle. Unlike the old-fashioned change propagation study where the concentration is contained by the product and the inventory management, this exploration is concentrated only to understand the propagation possessions of change on other functional storage tower only in the automotive manufacturing firm in USA.

An Empirical Study of Inventory Management in China conducted by Shan and Zhu (2013) indicated that China has progressively turned out to be the world-wide manufacturing centre through the outsourcing of manufacturing happenings from Western countries. They revealed that there has been an increasing awareness in quantifying the inspirations of such sweats on the commercial performance of Chinese firms, and examination has been carried out in areas such as finance and accounting. In this article the researcher conducted the quantitative research by using an information set of Chinese public firms available from the Wind Financial Database to examine the inventories of 1286 organizations recorded on the two stock exchanges in China, the Shanghai Stock Exchange and the Shenzhen Stock Exchange. They discovered that on average the inventory levels have dropped over time and that the firm-level figures is consistent with several implications derived from classical inventory models.On the other hand, due to restricted visibility of operational conclusions and data, there appears to be a lack of examination into the influences on the organizations' inventory management performance in the literature. The study was conducted on general manufacturing industry in China and none of the aerospace equipment facilities inventory management issues was included in this study.

Khaled and Whaba (2013) conducted the study about the corporate governance perspective of reinvestigating the connection between ownership structure and inventory management. Their investigation assumed that the connection between institutional ownership and inventory management is more probable to be qualified by other internal corporate governance instruments such as managerial possession, board control structure and board size. They provided solid indication for the applicability of this subject and exhibits that institutional ownership disturbs inventory management positively and negatively when managerial ownership is high and low, CEO duality (non-duality) is in position, or board size is large (small) through the use of Econometric analysis, utilizing a model of Egyptian listed corporations. Furthermore, they showed that the effectiveness of one corporate governance mechanism (i.e., institutional ownership) is more probable to be depending on some appropriate variables. Although the researchers' conclusion of this work is tough to the use of different control variables and econometric models disregards the inventory management principles and it concentrates only on Egyptian corporate governance perspective. Application of fault tree analysis to evaluate inventory risk by Cheng et al (2013) was conducted. And it was discovered in this article that an aerospace manufacturer pursues to lessen inventory and to advance its turnover rate by means of fault tree analysis. It looks like the organization historically controlled its inventory by means of

material capacity planning, material requirement planning modules provided as a portion of Enterprise Resource Planning and a self-developed inventory management system. By using the qualitative research methods, the researchers showed that historical data showed an increasing trend in the inventory revenue rate, and the entire inventory cost is significant, up to US$260 million. In this research, the researchers used a fault tree analysis method to rank development options on the basis of risk decrease. Study outcomes exposed that risk-based decision-making, supported by fault tree analysis, is valuable in managing the inventory issue. Inventory turnover rate specifies that inventory level has been upgraded 30% by means of the fault tree analysis. Even though this study was only concentrated on Taiwan aerospace manufacturing.

A multi-tier study on supply chain flexibility in the automotive industry study conducted by Thome and others (2014) revealed that over the past twenty years, the range of some crucial topics in operations management has prolonged further than the sole organization to take account the supply chain associates and their relations. Single illustration they have shown of such an addition is the modern idea of supply chain flexibility. They further shown that the growth of experimental multi-tier studies proficient of examining the inter-organizational components of supply chain flexibility is necessary. The researchers of explored the main effects of flexible supply chain capabilities to distribute products to end-customers by the use of the qualitative research design of numerous case study with both internal and external legitimacy checks, within-case examination and cross event comparisons, based on an exploration background that examines the relations between supply chain related restrictions and flexibility categories. The researchers proved the restrictions for instance suppliers' volume, assortment of suppliers, suppliers´ collaboration, expectation and obligation, rates, exchange rates and inventory were acknowledged in various supplier layers of the OEMs to be the key features persuading the perceived volume and combined flexibilities. And moreover, the supply chain elasticity types such as finding, personal, distribution, delay, new artefact and responsiveness biased the supply chain's flexibility delivered to the end-customers. Even though there has been substantial academic development supply chain elasticity, this study has been confined to Brazilian automotive manufacturing industry, there by neglecting other important aspects of an inventory management and there is the address of other industries like aerospace is not dealt with.

The study Joint optimization of preventive maintenance and inventory policies for multi-unit systems subject to deteriorating spare part inventory conducted by Jiang and others (2015) uncovered that under the contextual of the varied application of condition-based maintenance in maintenance practice, the combined optimization of maintenance and spare parts inventory is becoming a burning research to take full advantage of condition-based maintenance and lessen the operational rate. The additionally pointed that to avoid both the high inventory level and the scarcity of spare parts, an appointment policy of spare parts needs to be wished-for based on the forecast of remaining useful lifetime, and then an equivalent combined optimization model of preventive maintenance and spare parts inventory will be established. The researchers utilized a qualitative research approach where the combination method of inherited set of rules and Monte Carlo is presented to get the ideal all-out inventory level, safety inventory level, possible failure verge, and appointment verge to lessen the cost rate and they mentioned that it was due to the complexity of the model. Though the sensitivity analysis that they conducted, the results showed that the anticipated model is reliable with the actual situation of maintenance practices and inventory management. Although this significant research in the large Chinese aerospace manufacturing industry seems logical, it is felt that this research is concentrated only on the aviation sector and does not deal general aerospace inventory management.

Wang and others (2016) conducted a study about the chronological trends and four-dimensional variation characteristics of Chinese wide-ranging emission inventory of several air contaminants from iron and steel industry. The study pointed out that even if an energy and-pollution concentrated manufacturing sector, a comprehensive complete emission inventory of air contaminants for iron and steel industry of China is still not obtainable. They performed a quantitative research to get and better realize the chronological developments and spatial deviation features of classic dangerous air contaminants releases from iron and steel production in China through a comprehensive emission inventory of various air contaminants, including size separated particulate matter, gaseous contaminants, heavy metals is established with the unit-based yearly activity, exact dynamic release influences for the historical period of 1978-2011, and the upcoming possible developments till 2050 are predicted by using situation analysis. The study's outcomes shows that releases of gaseous contaminants and particulate problem have experienced a steady rise inclination ever since 2000, while releases of priority-controlled heavy metals have displayed a temporary variation throughout the era of 1990 to 2005. Although the authors conducted this significant research, the inventory management system dealt with in this research was mainly focused only on large Chinese mining industry. Other manufacturing industries nor aerospace industry inventory management system were not addressed.

Mining Available Data from the United States Environmental Protection Agency to Support Rapid Life Cycle Inventory Modelling of Chemical Manufacturing by Cashman and others (2016) suggested that stresses for speedy and precise life cycle evaluations generate a need for approaches to quickly produce dependable life cycle inventories. They additionally suggested that data mining is an appropriate instrument for this drive, predominantly given the huge amount of obtainable parliamentary information. The researchers explained that as the related open data turn out to be more predominant, it may be likely to systematize life cycle inventories by means of data mining by starting a reproducible method for recognising, removing, and processing the data method using a case study of acetic acid. Quantitative research method was then conducted where data value and gap analysis for the generated inventory found that the designated data bases can offer information with identical or better dependability and representativeness on air, water, hazardous left-overs, on-site energy utilization, and production quantities but with main data breaches as well as material inputs, water utilization, procured electricity, and shipping necessities. A comparison of the produced life cycle inventories with recent data exposed that the data mining inventory is in rational agreement with current data and may offer an added all-inclusive inventory of air releases and water releases. They showed that the case study emphasized trials for current data management practices that must be overcome to effectively systematize the method using semantic technology. Despite the fact that Cashman and others conducted this significant study about Mining Available Data from the United States Environmental Protection Agency in the mining industry, the researchers' main focus was on the analysis of the current material management procedure by using the quantitative research method in examining the existing practice and never addressed the effectiveness of the inventory management in this regard especially in the other industries like aerospace industry.

The impact of information technology adoption in small and medium enterprises supply chains in Gauteng and Free State provinces of South Africa by Mathu and Tlare (2017) surveyed the effect of information technology implementation by SMEs in Gauteng and Free State Provinces of South Africa. The supply chain incorporation and partnership of the SMEs was also discovered to determine the information technology inspiration. A quantifiable methodology in the form of questionnaire was used as the researchers assumed that it was the best way to quantify the degree of the information technology effect. According to the researcher, the discoveries from the research showed that information technology implementation improved incorporation and collaboration of Structural Equation Modelling supply chain. It also appeared that there was extensive application of information technology amongst most of the Structural Equation Modelling approached. Additionally, the results showed that other benefits that developed from the rising use of information technology in the supply chain including development of customer service, inventory management, lead time, and relationship construction. Without a doubt, introducing information technology expertise to the Structural Equation Modelling personnel was in fact knowledge improvement in executing commercial responsibilities. Although this research was conducted in South African SMEs, it focuses on general inventory management of information technology and nothing about the South African aerospace inventory management was dealt with.

3 CONCLUSION

The aim of this paper is to review of Inventory Management System in the South African Aerospace Industry. Subsequently, the review of inventory management systems has become a buzz word amongst the scholar and industry practitioners. Despite the fact that, the concept of inventory management system in aerospace is attending higher level of significant in the western countries, America and Asia due to its ability of smoothing the business environment, in Africa, particularly in south Africa, the integration and adoption of inventory management system in aerospace is facing several challenges. To date, over the past decade number of studies have been conducted in the past twenty years to investigate the benefit of inventory management implementation in the South African Aerospace industry at global level. However very few studies have been conducted from South African inventory management system perspective, hence, the overall goal of this paper is to fill this gap by means of critically analyzing studies that were developed in the field of inventory management over the past decade. The papers analyzed did not address the concerns in the aerospace industry inventory management system.

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Biography

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