Inventory Management – A Tool for Optimal Use of Resources and Overall Efficiency in Manufacturing SMEs

Olusakin S Akindipe[1]

Abstract

Observation shows that there is a serious problem regarding inventory management in manufacturing organizations, particularly in Small and Medium Enterprises (SMEs). This has prompted the desire to embark on a study that will examine the problem and strive to proffer useful suggestions. This paper intends to bring to the fore the salient issue of inefficiency in the practice of inventory management and its effects on production operations of manufacturing concerns. Survey design was used with the application of random sampling technique in selection of units within the case study areas. Primary data were collected through the use of structured questionnaires and the analysis was done using Pearson correlation coefficient and frequency counts and percentages to give adequate descriptions. The study concluded that efficient management of stock would be achieved through determination of stock levels, engagement of skilled store personnel, and the use of automated stock control. It went further to assert that the achievement of optimal use of resources through efficiency in the management of stock will eliminate the problems of sudden lack of stock; the resultant low capacity utilization, loss of production time, and thereby improving overall efficiency of the manufacturing SMEs and breed high performing entrepreneurs.

Keywords: *inventory management, production operation, manufacturing organizations, SMEs, resources, optimization, entrepreneur.*

Introduction

Inventory management is critical to the overall performance of any manufacturing concern, be it SME or large organization. Beside demand and other forces like competitors' actions and general price index, inventory situation in terms of efficient management and effective planning determines the activity level, the turnover and the ultimate profit in a given company. The inventory function is assumed to be organized and operated on an integrated

1 Olusakin Akindipe, MBA, MNIM, Igbajo Polytechnic, Department of Business Administration, Igbajo Polytechnic P M B 303, Igbajo, Osun State; Nigeria, e-mail: akindipeolu@yahoo.com.

basis and is presumed to be responsible for material forecasting, planning, inventory control, scrap control and disposal; providing management information regarding purchases and inventories within the framework of the financial policies and norms.

Inventory management being the coordination of efforts (planning, controlling, organizing, directing) towards achieving efficiency in the procurement, transportation, stocking and utilization of inputs of a manufacturing organization is therefore central to production activities and management. Effective and efficient functioning of the inventory management has direct bearing on the total performance of the organization and that of its managers. The management of inventory in a manufacturing organization therefore deserves attention and critical study in order to achieve uninterrupted production runs and enhanced performance in operations. Besides, holding the right stock level could improve the level of available working capital that could be profitably employed in other areas. These objectives could only be achieved through integrated approach to inventory management functions by combining planning, procurement and inventory control.

SMEs all over the world are said to be the major driving force of the global economies today both in terms of contribution towards the GDPs of nations and employment. Campos, Acuna, Nuno de la Parra and Valenzuela (2013) opined that in the entrepreneurial universe, microenterprises play a very special role in the business context of the economy. It is affirmed that 95% of manufacturing organizations in Nigeria are SMEs. Therefore, any serious discussion on national productivity and economic development must involve manufacturing SMEs. This reason informed the adoptions of some SMEs as units of the case study for this research effort.

The performance of SMEs has been a source of concerns to investors and political leaders alike, given the magnitude of the resources committed to ensure that SMEs play vital roles in the economic development of Nigeria, like their counterparts in other parts of the globe. It is disheartening to note that SMEs in the country have underperformed.

There are problems associated with raw material/inventory management in manufacturing organizations in Nigeria in general but the enormity of the problem in relation to Small and Medium Enterprises (SMEs) seems catastrophic, in view of the problems facing the SMEs and the mortality rate in the subsector. The National Association of Small Scale Industrialists (NASSI) in Nigeria is of the opinion that, the contributions of the manufacturing sector to the GDP have declined from 9.9% in 1981 to about 5.7% in 2003, while capacity utilization averaged between 30-35% annually during the years 2001-2005 (Ojukwu, 2006). The problems in manufacturing are rarely

given adequate attentions due to inability of people involved to trace them to inventory management.

The following problems are traceable to inefficiency in raw material/ inventory management in Nigeria:

1) The inefficient use of production time, labor and other resources due to delays or incessant short down and interruptions during production have become inherent part of operations in many manufacturing organizations in Nigeria. This often led to inability to meet customers' order and eventual loss of market shares. Low capacity utilization and loss of revenue as consequence of these problems led to closure of many manufacturing firms in the country.
2) The poor liquidity position of many manufacturing concerns, particularly the SMEs in Nigeria is a matter of concern to many stakeholders. To hold too much stock than necessary will lead to capital lock-up in inventory. The inventory held idle in stores has values attached to them; and the likelihood is that the organization will never regain the money in them if they become obsolete and useless.
3) In many manufacturing concerns in Nigeria, there is inadequate provision of good quality manpower in stock maintenance and management. This is, indeed, a serious issue since employees are those charged with the responsibility of monitoring progress and reporting impending insufficiency. They are to ensure that stocks are properly kept and protected against fire and other disaster or loss. The "people" are to ensure efficient use of warehouse facilities and space; keep proper and adequate records.
4) The employment of staff illiterates or semi literates is a source of the problems being experienced in most manufacturing organizations. This is evident in occurrence of incidences like misplacement and dislocation of vital documents, files and stock items. The inability to use inventory models and lack of knowledge of the use of quantitative values to produce information is the major hindrance in model application by store personnel (Akindipe, 2005).

This study evaluates the elements of inventory management and their significant impact in achieving optimization in the use of resources of the manufacturing SMEs and other producing organizations. It attempts to provide solutions to the problem being faced in inventory management and control. To this end, the specific objectives are: attempt to provide solution to the problem of in-optimal use of production time, labor and other resources in manufacturing organizations. Furthermore, the study sought to examine possible ways of forestalling the problem and more importantly, explore all avenues to ensure that there will be high level of organizational efficiency and development in the performance of the owner-manager through inventory management.

Significance of the study

This research focuses on the application of inventory management to achieve optimal use of resources and overall efficiency in manufacturing SMEs. It asserts that Inventory management is central to the attainment of optimization of resources and acceptable level of capacity utilization and improved performance.

The study has potentials to engender efficiency in production operations and bring about tremendous improvement in the performance of firms and their managers. Optimal use of resources as evident in removal of idle time, reduction of cost and adequate working capital will undoubtedly influence improved capacity utilization, improved profit, high competitiveness, waste reduction and customer satisfaction. The research is an addition to the body of knowledge, particularly in the fields of entrepreneurship, inventory management and production management.

Research hypotheses

In order to achieve the objectives of this study, the following hypotheses are advanced and tested during the course of this research.

Hypothesis 1 (H_1): There is strong relationship between determination of stock level and optimum use of production resources.

This proposition is on the premise that when the level of stock to hold at particular time is determined by a firm, such organization will obtain efficient use of its production resources. Resources like labor, time, fund and other operational facility will be used efficiently since idle time will be minimal on prevention of stock-out. When stock levels such as safety stock, maximum stock and re-order levels are established; it is expected that instances of stock-out will be forestalled.

Hypothesis 2 (H_2): There is strong relationship between engagement of skilled store personnel and optimal use of production resources**.**

This hypothesis is formulated on the basis that the realization of optimum use of production resources is a direct consequence of engagement of educated and skilled store workers. The use of illiterates and unskilled store personnel will be counterproductive, especially in developing countries where the level of automation is still very low. Skilled personnel are useful in stock tracking, and are instrumental to adequate record keeping, reporting low stock level, or impending damage to stock.

Hypothesis 3 (H_3): There is strong relationship between automated stock control and optimal use of production resources.

This postulation sees optimum use of resources as achievable through automated control and management of inventory. Automated system allows producers to input inventory and track the items that are delivered to store and spot depreciating inventory. Depending on the application software, automated inventory system alerts or triggers orders when re-order level is reached. The system prevents over and under stocking and therefore improves working capital, reduces waste and ensures that optimal use of labor and time are achieved.

Hypothesis 4 (H_4): There is strong relationship between optimum use of production resources and overall organizational efficiency.

This hypothesis stems from the fulfillment of optimization of resources. This study proposes that optimum use of resources as a direct consequence of stock level determination, engagement of skilled personnel, and automation will produce a direct effect on overall efficiency level in the SMEs. It is envisaged that overall efficiency will be attained with improved sales, customer satisfaction, improved profit and high competitive advantage for SMEs.

Hypothesis 5 (H_5): There is strong relationship between optimum use of production resources and performance of entrepreneurs.

Kachru (2011) opined that innovation and learning are the basis on which entrepreneurship is established. Upon attaining optimality in the use of resources, the owner-manager is motivated to improve his performance. The learning experience of the entrepreneur (through the process of attainment of overall-efficiency) is proposed to influence constant high-level performance and improved managerial skills since innovation and growth is inherent in entrepreneurship.

These hypotheses are further explained through the following research model:

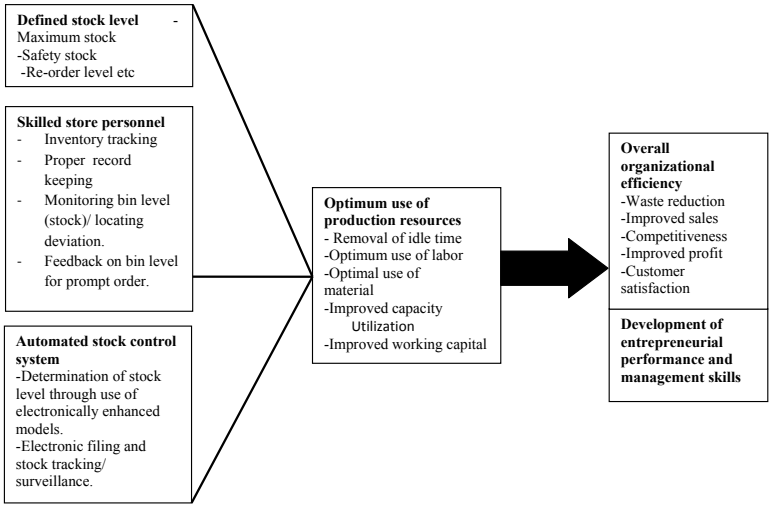

Figure 1. Research model

Literature review

In a work of this nature, a conceptual analysis of relevant studies on the problem under consideration is desirable; given the universal perception and the enormity of the challenges that inventory management has posed to manufacturers.

Inventory refers to totality of stocks, being held by a business enterprise at a particular time. The following groups of inventory are of concern to managers in manufacturing organizations:

1) Raw materials,
2) In-progress or semi-finished goods,
3) Finished goods.
4) Other stocks such as: tools, spare parts and production consumables.

Inventory management basically aims at providing both internal and external customers with the required service levels in terms of quality, quantity and order fill rate, to ascertain present and future requirements for all types of inventory to avoid overstocking while avoiding bottleneck in production and to keep costs to a minimum (Sharif, 2011).

Classification of inventory management system

The use of inventory management system in inventory management practice is imperative today; given the dynamic nature of operations in the frequently changing world of business.

Mantho, (1994) classified Inventory Management computer based activities into three broad areas:

1) *Inventory record keeping*: due to the availability of computers at a reasonable price, SMEs have found it appropriate to automate their inventory records through computerization.
2) *Inventory decision-making*: many models can be integrated into computer based inventory systems.
3) *Material requirement planning (MRP) system*: MRP is an Inventory Management (IM) information system concerned with getting the right materials to the right place at the right time.

However, modern Inventory Management systems are more challenging because of several variables. According to Sharif (2011), in a fluid IM environment, these factors include high inflation rates at certain periods, low availability of traditional materials, high costs of labor leading to less making and more buying, increasing numbers of suppliers entering the procurement market and rapid development of micro-processors and software in decision-making support systems. In addition, new technological innovations lead to the development of substitutes (for example, smart materials replacing steel and aluminum), which add to the challenges for IM (Mohanty 2009).

Universality of inventory management problem

Inventory management problem cut across national boundaries and sector divisions (Nasiri, Davoudpour and Karimi 2010). Its rears its ugly head virtually in all sectors of the global economy regardless of whether the business is retail, distribution or manufacturing.

Chan and Wang, (2014) made impressive contribution by examining the negative impact of inventory inaccuracy. They reported that in enterprise resource planning systems, the record of inventories are often not equal to the real quantities of inventories. So was Rajeev (2008), who studied forty small and medium enterprises (SMEs) in Bangalore, India and observed that even in an inventory intensive manufacturing industry sector, Inventory Management practices were poor. He went further that the use of formal practices for managing inventories was also inadequate. In the same vein, inventory management (IM) practices of small and medium scale enterprises in Finland and Greece were studied by Chikan and Whybark, (1990) to identify the experiences of managers concerning IM. The findings revealed that IM

decisions are made at the operational level with minimal guidance from the top.

Given the foregoing, it is clear that the problem of inventory management is universal and people had; over the years attempted to seek solution. The solution offered by Townsend (1992) is in what he termed "the standard requisition concept" which he said could be achieved through:

1) Determination of order quantity and stock level, to be controlled and managed;
2) Anticipation of workloads.

Dear (1989) suggests "an adaptive method of forecasting" by setting safety stocks in terms of a desired service (stock) level under management control using one of the adaptive available algorithms. In providing solution to inventory problem of perishable products, Ali, Madaan, Chan and Kannan (2013) applied logistic approach to determine optimum perishable schedule to forestall deterioration, shortages and time decay.

Wadhwa, Bibhushan and Chan (2009), studied the impact of impulsive demand fluctuations on different inventory policies used in supply chain and revealed that simpler inventory policies are better prepared to dampen or even reduce the impulsive demand fluctuations. In corroboration, Todd (1990) asserts that the problem started with the implementation of material management systems. He believes that material management will be successful if its implementation is one, which is designed to provide the real benefit. For Chan and Prakash (2012), in examining manufacturing supply chain with vertical, horizontal and lateral collaboration; they emphasized lateral collaboration by determining the impact of inventory policies on supply chain performance.

SMEs in developing countries

The Nigerian government has expended vast resources in its efforts to ensure the inflow of foreign direct investment (FDI), to boost the nation's economy, provide more jobs, improve GDP, and diversify the economy; making it less petroleum dependent. Attempts by governments to attract foreign investment may not produce the desired results unless efforts are made to contain the mortality rate of SMEs in the country.

A critical analysis of the global political economy reveals that the Asian nations are gradually moving from consuming nations to producing and large emerging economies with potentials to achieve greatness within the short run. This feat was possible, due largely to the use of SME as agent of economic transformation in these countries. The share of employment for SME accounted for 70% of total employment and the output share for over

46% in South Korea (Tang 2007). In 2007, Malaysia had 96% of establishments of SMEs, which contributed 30.7% of total manufacturing output and employed 31% of total workforce (Rose, Deros and Nordin, 2011). SMEs are the major growing force behind China's prominent success in terms of their contribution towards the national GDP (accounting for 40%), scale of assets, diversification of products, and the creation of employment (Tang 2009). SME has equal strategic importance in Nigeria. A study conducted in Nigeria by the Federal Office of Statistics shows that over 97% of all businesses in Nigeria employ less than 100 employees. This therefore means that about 97% of all businesses in Nigeria are SMEs (Ariyo, 2000). The Federal Government of Nigeria initiated and actualized some policy measures, like the setting up of Small and Medium Industries Equity Investment Scheme (SMIEIS), in the expectation that improved funding would facilitate the achievement of higher economic growth. It has been stated that small and medium enterprises (SMEs) now constitute about 95%, by numbers, of the organized manufacturing establishments in Nigeria (Ojukwu, 2006). The contribution of these SMEs to the Nigerian economy, in terms of GDP, exports and employment is low.

Despite the potential role of SMEs to accelerate economic growth and create jobs in developing countries, a number of challenges impart their ability to realise their full potentials. Beside the inventory related problems of SMEs earlier identified, there are other problems that are common to them, irrespective of their level of operation, their sector of operation and the country within which they operate. The development of SMEs is plagued by lack of managerial skills, equipment and technology, and inadequate finance. Despite the numerous institutions providing training and advisory services, there is still a skills' gap in the SME sector as a whole (Kayanula and Quartey, 2000). In terms of technology, SMEs often have difficulties in gaining access to appropriate technologies and information on available techniques (Aryeetey, 2001). SMEs are regarded by creditors and investors as high-risk borrowers; due to insufficient assets and low capitalization, vulnerability to market fluctuations and high mortality rate (Abereijo and Fayomi, 2005).

One of the ways of solving the numerous problems of SMEs is through efficient inventory management.

Research methodology

This research used the survey research design. The study population of this research was restricted to the members of staff of ten (10) manufacturing SMEs in Lagos, Onitsha and Ibadan, all in southern part of Nigeria. Out of the ten (10) SMEs considered, four (4) were selected from Lagos being the most industrialized and three (3) each from Ibadan and Onitsha. The choice

of SMEs as case study was informed by the reason that SMEs constitute about 95% of the manufacturing organizations in Nigeria as earlier reported. Their respective Owner-managers, Executive Managers and Supervisors represented the selected SMEs. A total of two hundred and fifty (250) managers and supervisors were randomly selected as samples and questionnaires were dispatched to them. Out of the two hundred and fifty (250) participants who received the questionnaires, two hundred and thirty one (231) respondents filled and returned the questionnaires for analysis. This indicates 92.4% response. The response rate was considered high enough and acceptable for the study.

All items in the research questions used five-point Likert scale ranged from 1 = "strongly disagree" to 5 = "strongly agree." To ensure the validity of the research instrument, content validity which deals with item validity and sampling validity was used to ensure adequacy by the scope implied by the subject of study. In addition, experts in the field also helped in the evaluation of the question items of the instrument and the adequacy of the sample elements of the population by measuring the instrument used. In this study, the test-retest reliability was used to check the degree of consistency of the instrument. This was done by distributing the questionnaires on two occasions to determine the level of consistency. The result was not the same but highly correlated, which shows that the research instrument is reliable for the research work. The data collected through the questionnaire were analyzed using descriptive statistics while coefficient of correlation was employed to test the hypotheses and establish the relationship between the variables. Specifically, Pearson's correlation coefficient was preferred, because the measurement level on each variable value is on continuum scale and found to be normally distributed based on histogram curves.

Data analyses and discussion of results

Relevant data obtained from the field that deals with the objectives of the study were analyzed and interpreted accordingly. The research hypotheses were also tested to determine their validity or otherwise. Frequency counts and correlation analyses were used to test the hypotheses.

Data analyses

Each hypothesis was tested separately to determine its relevance in the light of the available evidence from the data collected and analyzed for the study. The descriptive analysis of respondents' opinion and the Pearson's correlation in respect of the test of all the five hypotheses are presented based on the related hypotheses as follows:

H_1: There is strong relationship between determination of stock level and optimum use of production resources.

Table 1. Relationship between determination of stock level and optimal use of resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	99	42.9	42.9	42.9
	AGREE	104	45.0	45.0	87.9
	UNDECIDED	15	6.5	6.5	94.4
	DISAGREE	12	5.2	5.2	99.6
	STRONGLY DISAGREE	1	.4	.4	100.0
	Total	231	100.0	100.0	

The Table 1 above indicates 42.9%, 45.0%, 6.5%, 5.2% and 0.4% response for strongly agree, agree, undecided, disagree and strongly disagree respectively; a cumulative percentage response of 87.9% for strongly agree and agree; showing positive opinions on relationship between determination of stock level and optimum use of resources.

Table 2. Showing correlations between determination of stock level and optimum use of resources

		Determination of stock level	Optimum use of resources
Determination of stock level	Pearson Correlation	1	.984**
	Sig. (2-tailed)		.000
	N	231	231
Optimum use of resources	Pearson Correlation	.984**	1
	Sig. (2-tailed)	.000	
	N	231	231

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 2 above, the relationship between the two variables is significant with a correlation of .984 at 0.01 levels. Hence, we accept **H_1**: that there is strong relationship between determination of stock level and optimum use of resources. Therefore, a strong relationship exists between determination of stock level and optimum use of production resources.

H_2: There is strong relationship between engagement of skilled store personnel and optimal use of production resources**.**

Table 3. Relationship between engagement of skilled store personnel and optimum use of resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	54	23.4	23.4	23.4
	AGREE	129	55.8	55.8	79.2
	UNDECIDED	21	9.1	9.1	88.3
	DISAGREE	21	9.1	9.1	97.4
	STRONGLY DISAGREE	6	2.6	2.6	100.0
	Total	231	100.0	100.0	

Table 3 indicates 23.4%, 55.8%, 9.1%, 9.1% and 2.6% response for strongly agree, agree, undecided, disagree and strongly disagree; showing also a cumulative percentage of 79.2 for strongly agree and agree. This shows positive response on relationship between the two variables.

Table 4. Showing correlations between engagement of skilled store personnel and optimum use of resources

		Optimum use of resources	skilled store personnel
Optimum use of resources	Pearson Correlation	1	.861**
	Sig. (2-tailed)		.000
	N	231	231
skilled store personnel	Pearson Correlation	.861**	1
	Sig. (2-tailed)	.000	
	N	231	231

**. Correlation is significant at the 0.01 level (2-tailed).

The Table 4 above shows the analysis of the correlation of .861 between engagement of skilled store personnel and optimum use of resources. The strength of the relationship is significant at 0.01 levels. Hence, $\mathbf{H}_2$ is accepted: that there is strong relationship between engagement of skill personnel and optimum use of resources is accepted.

H_3: There is strong relationship between automated stock control and optimal use of production resources.

Table 5. Relationship between automated stock control and optimum use of resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	66	28.6	28.6	28.6
	AGREE	109	47.2	47.2	75.8
	UNDECIDED	26	11.3	11.3	87.0
	DISAGREE	27	11.7	11.7	98.7
	STRONGLY DISAGREE	3	1.3	1.3	100.0
	Total	231	100.0	100.0	

Table 5 above indicates 28.6%, 47.2%, 11.3%, 11.7% and 1.3% response for strongly agree, agree, undecided, disagree and strongly disagree respectively; a cumulative percentage response of 87.9% for strongly agree and agree on relationship between automated stock control and optimum resources. This shows positive response on relationship between the two variables.

Table 6. Showing correlations between optimum use of resources and automated stock control

		Optimum use of resources	Automated stock control
Optimum use of resources	Pearson Correlation	1	.858**
	Sig. (2-tailed)		.000
	N	231	231
Automated stock control	Pearson Correlation	.858**	1
	Sig. (2-tailed)	.000	
	N	231	231

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 6 above, the relationship between the two variables is significant with a correlation of .858 at 0.01 levels. Hence, $\mathbf{H}_3$ is accepted. Therefore, a strong relationship exists between automated stock control and optimum use of production resources.

H_4: There is strong relationship between optimum use of production resources and overall organizational efficiency.

Table 7. Relationship between optimum use of resources and overall efficiency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	101	43.7	43.7	43.7
	AGREE	103	44.6	44.6	88.3
	UNDECIDED	15	6.5	6.5	94.8
	DISAGREE	10	4.3	4.3	99.1
	STRONGLY DISAGREE	2	.9	.9	100.0
	Total	231	100.0	100.0	

Table 7 indicates a response of 43.7%, 44.6%, 6.5%, 4.3% and 0.9% for strongly agree, agree, undecided, disagree and strongly disagree respectively; a cumulative percentage response of 88.3% for strongly agree and agree on relationship between optimum use of resources overall efficiency. This shows positive response on relationship between the two variables.

Table 8. Showing correlations between overall efficiency and optimum use of resources

		overall efficiency	optimal use of production
Overall efficiency	Pearson Correlation	1	.872**
	Sig. (2-tailed)		.000
	N	231	231
optimal use of production	Pearson Correlation	.872**	1
	Sig. (2-tailed)	.000	
	N	231	231

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 4 above, the relationship between overall efficiency and optimum use of resources is significant with a correlation of .858 at 0.01 levels. Hence, $\mathbf{H}_4$ is accepted.

Therefore, a strong relationship exists between automated stock control and optimum use of production resources.

H_5: There is strong relationship between optimum use of production resources and performance of entrepreneurs.

Table 9. Relationship between optimal use of resources and entrepreneur's performance/ managerial skill development

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY AGREE	64	27.7	27.7	27.7
	AGREE	120	51.9	51.9	79.7
	UNDECIDED	21	9.1	9.1	88.7
	DISAGREE	22	9.5	9.5	98.3
	STRONGLY DISAGREE	4	1.7	1.7	100.0
	Total	231	100.0	100.0	

Table 9 indicates 27.7%, 51.9%, 9.1%, 9.5% and 1.7% for strongly agree, agree, undecided, disagree and strongly disagree. In addition, respondents' view indicates 79.7% cumulative for strongly agree and agree; showing positive response to research suggestion.

Table 10. Showing correlations between optimum use of resources and entrepreneur's performance/ skill development

		Entrepreneur's performance	Optimal use of resources
Entrepreneur's performance	Pearson Correlation	1	.872**
	Sig. (2-tailed)		.000
	N	231	231
Optimal use of resources	Pearson Correlation	.872**	1
	Sig. (2-tailed)	.000	
	N	231	231

**. Correlation is significant at the 0.01 level (2-tailed).

The Table 10 shows an analysis of correlation of .872 between entrepreneur's performance/ skill development and optimum use of resources. The strength of the relationship is significant at 0.01 levels. Therefore, we accept $\mathbf{H}_5$ that there is strong relationship between optimal use of resources and entrepreneur's performance.

Discussion of results

Tables 1, 3, 5, 7 and 9 provides information on respondents' views concerning the research questions; while tables 2, 4, 6, 8 and 10 are about correlations (r) between variables. A correlation is conducted to identify the strength and direction of relationship between two variables (Pallant, 2011). According to

Elifson, Runyon, and Haber (1998), the r-value should range from zero to one (that is, $0 \leq$ or ≤ 1). They explain further that r-value, which range from 0.01 to 0.30, should be considered as weak, from 0.031 to 0.70 should be regarded as moderate and 0.71 to 0.99 should be interpreted as strong. Consequently, it is important to note that all the r-value obtained in the above analyses are above 0.71 meaning that they are strong.

Results from Table 2, Table 4, Table 6, Table 8 and Table 10 indicate that significant relationship exists between the pairs of dependent and independent variables; all relationships are found statistically significant at p-value 0.01. Based on the suggestion by Elifson et al (1998), all strength of relationships between the variables were strong. Hence, the results indicate that $\mathbf{H}_1$ to $\mathbf{H}_5$ are supported.

From the statistical analysis performed, the study establishes that determination of stock level, engagement of skilled store personnel and automated stock control significantly, positively and strongly influence optimality in the use of production resources.

It was further observed that optimal use of resources had significant, positive and strong influence on overall organizational efficiency. In the same vein, optimal use of resources is discovered to have significant, positive and strong influence on entrepreneur's performance and development of entrepreneur's managerial skills.

Conclusion

Based on the empirical and theoretical findings, there is significant, positive and strong relationship between determination of stock level, engagement of skilled personnel, automated stock control and optimal use of production resources. The empirical results in particular further reveals that there is significant, positive and strong relationship between optimum use of resources and overall efficiency on one hand; and between optimum use of resources and entrepreneur's personal performance/development on the other hand.

Noting that indeed, significant, positive and strong relationship exist between all pairs of variables of the hypotheses tested; we conclude that where levels of stock are determined, perhaps with models or automation, sudden unavailability of stock will be forestalled. With the removal of stock-out, other banes such as loss of production time, low capacity utilization, and inability to meet production targets will be removed. In addition, the engagement of skilled stock personnel and automation will boost the efficiency level in stock management leading to optimization of resources. When the desired efficiency is attained, the culture of continuous maintenance of obsolete and

slow moving items will be stopped. The discontinuation of the practice of keeping obsolete and slow moving items will go a long way in assuring that tied-up fund that could be useful as working capital is available. In this way, liquidity positions of manufacturing organizations will be better and overall efficiency of production operations will be enhanced. Consequently, the entrepreneur is motivated to seek to attain constant high-level performance and improved managerial skills since innovation and growth is inherent in entrepreneurship.

Although the situation being experienced in the practice of inventory management in Nigeria today is to say the least, disheartening; given the poor level of computerization, non-determination of stock level, the involvement of illiterates and unskilled personnel in the management of inventory; the prospects for improvement are evident. This assertion is on the strength that manufacturers are willing to adopt research reports of this nature as working papers in solving the identified problems.

Towards optimization and efficiency

Despite the slight difference in the Nigerian situation from the rest of the world, particularly the advanced economies where business organizations are IT compliance; within a different socio-cultural and more literate environment, the same suggestions could be applicable in similar circumstances. To this end, the following recommendations are proffered to ensure efficiency in the practice of inventory management in Nigeria and other parts of the globe:

1) It is recommended that manufacturing organizations should always determine the minimum level of stock to carry. This is to ensure that stock-out or sudden unavailability is forestalled. With the removal of stock-out, other banes such as loss of production time, low capacity utilization, and inability to meet production targets will be removed.
2) That manufacturing organizations should make inventory plans and schedules such that arrival of inventories is programmed to ensure that there is no delay between requisition time and the time of supply. This will prevent production operations from being disrupted and as such low capacity utilization and inability to meet production targets will be addressed.
3) All slow-moving stock items should be identified; their time of need noted to ensure that the maintenance of such item stops immediately. All obsolete items should be sold to recoup capital lock up in them. Acquisition of obsolete items could be removed by being aware of trends in the technological and business environments. Over-stocking could be forestalled by having clear definition of maximum stock level. An adherence to recommendations on slow-moving stock, obsolete items and over-stocking would ensure that tied-up fund that could be

useful as working capital is available. In this way, liquidity positions of manufacturing organizations will be better.

4) Employment of stack illiterates as store workers should be stopped as it results in problems such as misplacement and dislocation of vital documents, files and stock items. In areas where higher stock management education is not required, employee should be given adequate orientation and training. There should also be training and retraining of employees to ensure that they are kept abreast of developments in the field.
5) Automated inventory management system is capable of eliminating most problems relating to engagement of unskilled personnel, perform some beneficial operations earlier mentioned and can limit cost. Where affordable, the introduction of electronic stock management devices is highly recommended.

Future research scope

The research concludes that determination of stock level, engagement of skilled store personnel and automated stock control strongly influence optimal use of resources. Resources were treated as single construct. However, further studies could treat these resources: time, labor, material, installed capacity and working capital, separately and consider the effects of stock level determination, skilled store personnel and automation on them.

Furthermore, this paper affirms the influence of optimization on overall performance of organizations and development of entrepreneurial skills without adequate consideration of performance variables like waste reduction, improved sales and profitability. Further studies could examine the influence of optimization based on different aspects of performance.

Moreover, the paper examines optimization and performance from the opinions of owner-managers and their subordinates in the case study areas. Future studies could take more objective approach, by analyzing optimization of resource and performance based on available data.

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Abstrakt (in Polish)

Obserwacje pokazują, że istnieje poważny problem dotyczący zarządzania zapasami w organizacjach wytwarzających, w szczególności w sektorze małych i średnich przedsiębiorstw (MŚP). Sytuacja ta zrodziła chęć zbadania problemu i opracowania użytecznych sugestii. Nasza praca ma na celu podkreślenie kwestii braku efektywności praktyk zarządzania zapasami oraz ich wpływu na działalność firm produkcyjnych. W badaniu zastosowano technikę losowo dobranej próbki do wyboru jednostek mających stanowić podstawę studiów przypadku. Podstawowe dane zebrano używając ustrukturyzowanych kwestionariuszy, jak również przeprowadzono analizę współczynnika korelacji Pearsona, oraz rozkładu częstości i udziałów, w celu stworzenia adekwatnych opisów. Badanie dowodzi, że wydajne zarządzanie zapasami można osiągnąć poprzez określenie poziomów zapasów, zaangażowanie wykwalifikowanego personelu magazynu oraz użycie systemów automatycznej kontroli zapasów. Badanie dowiodło także, że osiągnięcie optymalnego wykorzystania zasobów poprzez efektywne zarządzanie zapasami wyeliminuje problem nagłego braku zapasów, wynikającą z niego słabe wykorzystanie mocy produkcyjnych, utratę czasu produkcji, a w wyniku tego poprawi ogólną efektywność MŚP z sektora wytwórczego i da szansę na zaistnienie przedsiębiorcom osiągającym dobre wyniki.

Słowa kluczowe*: zarządzanie zapasami, operacje produkcyjne, organizacje produkcyjne, MŚP, zasoby, optymalizacja, przedsiębiorca.*

Biographical note

Olusakin Akindipe is a seasoned management consultant, Administrator and Teacher who has a number of publications to his credits. A member of the Nigerian Institute of Management, he holds a master's degree in Business Administration from the University of Ado-Ekiti, Nigeria. His wealth of experience over the years at various positions in the industry and in teaching qualifies him a reliable source on Production Management issues. He is currently a lecturer, Head of Department of Business Administration and Ag. Dean, faculty of Management studies Igbajo Polytechnic, Igbajo, Nigeria.