Logistics Management Information Systems, Training and Availability of Contraceptives: A Case of Uganda's Public Health Sector

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Abstract

This paper examines the influence of logistics management information systems and training on the availability of contraceptives in Uganda's public health sector. The study was motivated by the increased unavailability of the commonly demanded contraceptives and their implications for the local economy. Drawing from the resource dependence theory (RDT), this study adopts a deductive approach to address the issue at hand. Using a multi-stage sampling design, quantitative data were collected from 110 self – administered questionnaires from public health centre IIs in South Western Uganda. The Questionnaires were administered to an officer responsible for managing logistics from each of the selected public health facilities. PLS-SEM approach was used for data analysis. The findings of the study reveal a positive and significant influence between logistics management information systems (LMIS) and the availability of contraceptives in the public health sector. Similarly, the study results also indicate that there is a positive and significant influence of training on the availability of contraceptives. The government and other policymakers are advised to increase resources to implement more logistics management information systems (LMIS) in public health facilities, improve capacity building through increased training of medical workers and village health teams (VHTs) as well as implementing adolescent clinics.

Key Words: Logistics management information systems, Training, Contraceptives, Stochastic

Introduction

Availability of contraceptives has been identified as a critical element in minimizing unwanted pregnancies and its associated effects in both developing and developed economies (Jones, 2005; Ooms et al., 2020). Kefale et al. (2020), reveal that availability of contraceptives is one of the remedies to teenage pregnancies that enhance sustainable development in both developed and developing economies. Besides, Mezmur et al. (2021) assert that while there are many people who do not seek contraception globally, their availability is necessary for regulating population growth. Although unwanted pregnancies occur in both developing and developed economies, the United Nations Population Fund (2013) reports that approximately 95% of these unwanted pregnancies (among adolescents) occur in developing economies mainly due to low rates of availability of contraceptives. These low rates of availability of contraceptives in developing economies could be related to inadequate information systems such as logistics management information systems (LMIS) and trained medical personnel who are tasked to pass over knowledge associated with contraceptives usage (Thaci & Foster, 2018). Logistics management

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information system (LMIS) if well implemented can capture clear and unbiased information regarding customers' requirements, analyses it and disseminates it to the suppliers to ensure timely supply of health products (Subramanian, 2020).

A logistics management information system (LMIS) is used to gather, analyse and validate data from all levels of the logistics system that can be used to make logistics decisions on how to guarantee consistent availability of health products in public health facilities (Tiye & Gudeta, 2018). In agreement, Ahmadi et al. (2015) and Shahzad et al. (2021) argue that for public health facilities to obtain clear and unbiased logistics information that can help to increase awareness on the availability of health care products as well as reducing the myth and misconceptions about the effects of these products, there is need to implement logistics management information systems (LMIS). Besides, Jones (2005) argues that reducing information asymmetries about contraceptives through the use of information systems like the logistics management information systems (LMIS) could enhance timely and accurate information about the needs of the customers and thus be able to make them available on time. Consistent with resource dependency theory (RDT) Pfeffer and Salancik (1978), asserted that information is a vital resource that the public health sector needs to capitalize on to bring closer the right products needed by the clients (Davis & Cobb, 2010; Moons et al., 2019). To minimise the information asymmetries that exist in the public health sector due to the predominance of interdependencies, it is vital for the sector to adopt and implement logistics management information systems and also increase capacity building through regular trainings of medical personnel (Chandani & Breton, 2001; Shahzad et al., 2021).

Previous scholars such as Ageron et al. (2018) and Moons et al. (2019) argue that health facilities that are able to adopt and implement information systems such as LMIS and train their medical personnel on how to operate these systems are likely to benefit from timely decision making and thereby guaranteeing timely availability of heath products in the public health sector. This signifies that for public health facilities to safeguard consistent availability of contraceptives, there is a need to adopt appropriate information systems such as logistics management information systems and training the right staff to manage such systems. Moreover, Kritchanchai et al. (2018) and Subramanian (2020) further expounded that development of a logistics management information system in a public sector raises the needs of stakeholders such as customers to the suppliers and consequently enhances the needs availability. This study was conducted in Uganda's public health sector because of its uniqueness compared to the private health sector. The public health sector in Uganda is unique in terms of governance style, its major objective of saving people's lives and institutional arrangement (Seidman & Atun, 2017). Since Uganda constitutes the highest rates of school dropouts in the East African region, due to adolescent pregnancies. This complicates issue of service provision in the country to the target clientele. For instance, in 2018, Uganda recorded 31.5 percent, Tanzania 26.7 percent, Kenya 13.14 percent and Rwanda 7.3 percent adolescent pregnancies (Kassa et al., 2018). Nara et al. (2020) further assert that every year about 10 percent of young women in Uganda drop out of school due to teenage pregnancy. The high prevalence rates have been as a result of the limited availability of contraceptives in many developing economies, including Uganda (Benson et al., 2018; Stoner et al., 2019).

Scholars such as Ahmadi et al. (2015) and Kritchanchai et al. (2018) argue that the biggest challenge to availability of contraceptives to many developing economies could be related to the way LMIS is implemented and knowledge of the users. Additionally, Moons et al. (2019) revealed that the main limiting factor to contraceptives availability in developing economies still lies with the way information is being handled where it is still rotated around the manual methods that makes it difficult to share the right information on time. Despite this knowledge development, unavailability of contraceptives in Uganda's public health sector, still remains a challenge compounded by regular stock-outs, that subsequently force patients to seek care in other sectors where there are affordability challenges (Mukasa et al., 2017; Ooms et al., 2020). Additionally, literature that links logistics management information system (LMIS) and training on availability of contraceptives, specifically focusing on the public health sector is still scanty. This study therefore investigates the influence of the logistics management information system and training on the availability of contraceptives in the public sector.

Literature Review

Logistics Management Information Systems (LMIS)

Anjomshoae et al. (2017) contend that LMIS is a critical tool used in identifying the rate at which the health care products are consumed, the needs of the clients and customer orders in these public health facilities, thereby enhancing their availability. Tiye and Gudeta (2018) further explicates that logistics management information systems, if well implemented can enhance availability of public health products to clients, improve the quality of care and customer satisfaction through gathering accurate data, analysing and validating it from all levels of the logistics system. Consistent with resource dependency theory (RDT), information is a vital resource that organisations can capitalize on to bring closer the right products needed by the clients (Rao et al., 2007; Davis & Cobb, 2010). The RDT assumes that public health facilities manage their dependencies in the face of uncertainty and that, as the demand for contraceptives become more stochastic and dependencies increase, public health facilities seek a logistics management information system that is capable of capturing reliable information and disseminate it to all the stakeholders to minimise stockout situations (Wudhikarn et al., 2018; Moons et al., 2019). Furthermore, Kritchanchai, et al. (2018) emphasise that obtaining the right information from the external environment, especially from the users could be a critical resource in procurement planning and in developing efficient distribution networks which enhances the availability of contraceptives.

The inter-dependencies that exist in the public health sector requires collaborative relationships through sharing accurate and unbiased information among the various public health facilities (Subramanian, 2020). Drawing from the resource dependency theory, there is a dire need for public health facilities to minimise information asymmetries that exist amongst them through ensuring that there is a steady flow of accurate and reliable information by adopting and implementing logistics management information systems. Jones (2005) argues that because of information problems that are either wrongly captured or distorted while being disseminated, contraception is not always easy to obtain. This therefore necessitates a logistics management information system that is capable of capturing information, analyse it and disseminate it to clients on time. In agreement, Subramanian (2020) note that the deployment of information systems such as the logistics management information systems helps organisations in minimising the distortion of information flow and improves client's needs awareness. Zhang et al. (2018)

argue that public health facilities that need to facilitate timely information sharing and decision making, should adopt advanced information technologies such as logistics management information systems and organise regular meetings to disseminate the information. In agreement Wudhikarn et al. (2018) reveal that organisations that have established information systems like logistics management information systems are capable of improving forecasting and planning, delivery schedules as well as obtaining an accurate assessment of the customer's requirements. This therefore signifies that logistics management information systems are engines to providing suppliers with the right information regarding clients' needs and thereafter be able to make informed decisions on how to ensure consistent availability of contraceptives in public health facilities. Chandani and Breton (2001) and Subramanian (2020) argue that logistics management information systems, if well implemented, can help organisations to determine the flow of stock-level and consumption data along the same channels and thus can inform decisions that are critical to meeting current and future needs.

Moons et al. (2019) reveal that improved data systems such as logistics management information (LMIS) shapes the procurement strategy in the sector that subsequently leads to availability of contraceptives in the public health sector. Similarly, Subramanian (2020) notes that logistics management information systems in public health facilities can aid in standardisation of data and improve direct communications with suppliers that consequently improve availability of contraceptives. Besides, Zhang et al. (2018) also asserted that health facilities that have established information systems like LMIS could improve on forecasting and planning, delivery schedules as well as obtaining accurate assessment of customer requirements that subsequently improves availability of contraceptives. Based on this discussion, the study hypothesises that: -

H1: LMIS has a positive influence on the availability of contraceptives

Training

Training health care providers keep them abreast with the knowledge and information regarding the range of contraceptive choices available for their clients so that they are able to make rational decisions about the contraceptives for which to requisition (Orr et al., 2016 & Cook et al., 2019). In addition, Coe & de Beyer (2014) and Subramanian (2020) reveal that training of community distributors increases awareness in communities that eventually improves requisitions from clients thereby improving their availability. Similarly, Jones (2005) and Wudhikarn et al. (2018) argue that the major root causes of contraceptives unavailability in public health facilities arise from lack of accurate and reliable information regarding the whereabouts of these contraceptives as well as how to obtain them. Trautmann et al. (2009) and Moons et al. (2019) note that the major hindrances to product availability in many developing economies, is the internet connectivity that is never stable and computer illiteracy that limits effective and accurate data capture concerning customers' requirements. Yet, Anjomshoae et al. (2017) argue that public health facilities that intend to ensure a consistent availability of products should centralize demand information through systems like logistics management information systems to be able to reduce variations in service times, improve service quality and also handle the surge of demand. This therefore denotes those organisations that adopt logistics management information systems as well as training health workers on how to use systems do enhance the customers' needs awareness and subsequently improve their availability.

Previous scholars such as Kroelinger et al. (2019) also acknowledged the role of training on increasing awareness and staff capacity to administer some of the products that require some technical skills hence providing a basis for a sustainable provision of contraceptives in the sector. In agreement, Stone et al. (2020) reveal that training programs in the public health sector could expand on the number of distribution centres in the communities and enhance the confidence among the users and subsequently improving the ordering frequencies. Based on this discussion therefore, it can be advanced that training programs in the public health facilities could be key in the availability of contraceptives in the public health sector. Based on this discussion therefore, the following hypothesis is worth testing: -

H2: Training has a positive influence on the availability of contraceptives

Conceptual Framework

This study examined the influence of logistics management information systems (LMIS) and training on availability of contraceptives in Uganda's public health sector. The research model in Figure 1, specifies the linkages between LMIS and training drawn from the empirical studies and resource dependence theory (RDT), as they explain the availability of contraceptives in the sector. The conceptual model was based on the synthesis of theoretical and empirical literature in order to systematize and provide guidance to this study. The conceptual model below indicates the hypothesized relationships among the variables of the study. In the model, LMIS and training are independent variables while availability of contraceptives is the dependent variable. Therefore, this study asserts that availability of contraceptives in the public health sector, is closely related to logistics management information systems and training, *ceteris paribus*.

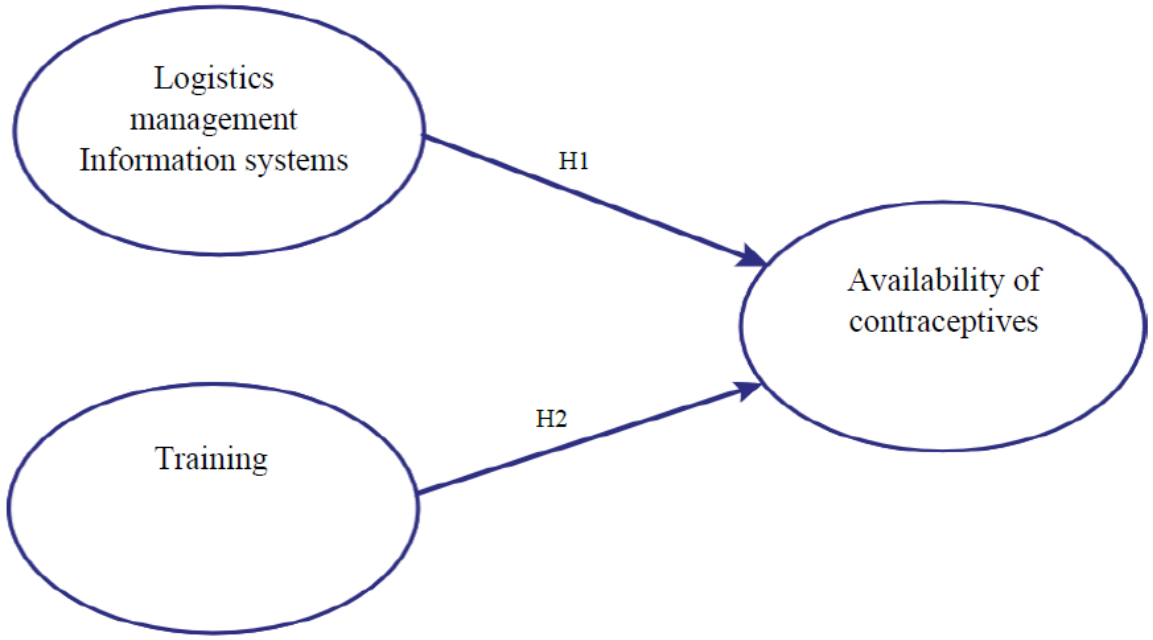

Figure 1. Conceptual Framework

Methodology and Research Approach

This study was explanatory research as it sought to explain the influence of logistics management information systems (LMIS) and training on availability of contraceptives in Uganda's public health sector. The data was collected between January 2021 and March 2021. The population of the study included all public health center IIs operating in south western Uganda (Kabale, Kanungu, Kisoro, Ntungamo and Rukungiri districts). According to Uganda's national health facility master list of 2018, there are 220 health center II facilities in this region. This population of health facilities was selected because they constitute the largest number of health units that are located in both rural and urban areas where they serve more than 75% of the total population. Moreover, South Western Uganda has got the highest population density of 300 persons/km^2, besides the region is characterised with the highest teenage pregnancies in Uganda (Prada et al., 2016). Through survey, 110 usable questionnaires from public health center IIs in South Western Uganda were collected. The sample size of the study was determined using the Krejcie & Morgan table of 1970. The study employed a multi-stage sampling design. The public health facilities in South Western Uganda were first stratified into hospitals, health centre IVs, health centre IIIs and health centre IIs.

A stratified random sampling procedure is a probability sampling procedure in which the population is divided into several relevant strata, and a random sample is drawn from each stratum (Saunders et al., 2009). It is assumed that the strata are internally homogeneous, which is typical of the public health facilities in Uganda's public health sector. Since districts have different numbers of the respective units, probability proportional to size (PPS) was used to ensure a proportionate distribution of the sample. Then simple random sampling was used to select a health unit from each stratum in a district based on a list of units obtained from the ministry of health. At the health facility, an officer responsible for the procurement activities and managing physical distribution of contraceptives was given a questionnaire to provide complete information regarding this study from the five districts, i.e. Kabale, Kanungu, Kisoro, Rukungiri and Ntugamo districts. Alongside a formal letter requesting logistics personnel of these public health facilities, the questionnaires were either handed to the participants or emailed. This enabled participants to allocate ample time to fill the questionnaire and also a platform for more clarity whenever there was a need. The sample size of this study includes 110 health center IIs. The study first examined whether there is a significant difference in the availability of contraceptives among the public health facilities. To test this, an ANOVA test was used with the help of the SPSS software. Results in Table 1, indicate that health centers are significantly different from each other in relation to availability of contraceptives.

Table 1. ANOVA Results

ANOVA[a] Model	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Regression	4.968	4	1.242	5.087	.001[b]
Residual	39.064	160	.244		
Total	44.032	164			

a. Dependent Variable: availability of contraceptives
b. Predictors: (Constant), h4, h2, h3, h1

Notes: h1 = Health center IIs, h2= Health center IIIs, h3= Health center IVs, h4 = Hospitals

The study further tested for the magnitude of the differences in the availability of contraceptives among the four strata that make up the public health facilities in the region. This was done with the help of a linear regression model as shown in Table 2.

Table 2. Linear regression results (testing for the magnitude of the difference)

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	4.297	.198		21.728	.000
h1	-.497	.203	-.453	-2.444	.016
h2	-.324	.206	-.262	-1.571	.118
h3	-.057	.206	-.031	-.275	.783
h4	.320	.284	.095	1.128	.261

a. Dependent Variable: availability of contraceptives

Notes: h1 = Health center IIs, h2= Health center IIIs, h3= Health center IVs, h4 = Hospitals

Results indicate that higher health centers (IIIs, IVs and hospitals) had insignificant effect on availability of contraceptives. Hospitals have greater chances of having contraceptives compared to others (coefficient positive) but the effect is not significant (p= 0.261). This may be because of the distribution of health facilities since there are many health center IIs. Further analysis is thus based on availability of contraceptives in health center IIs.

Measures

The study assessed the common method bias (CMB) using the variance inflation factor (VIF). According to Hair et al. (2019), there are no common method bias (CMB) issues between each set of independent variables if VIF values are below 3. Table 6 indicates that there are no CMB issues. Indicators for both independent and dependent variables were established based on theoretical and empirical literature (Klarner et al., 2013). Following Tehseen et al. (2017) all the variables were captured using multi-item indicators. The indicators of logistics management information systems (LMIS) were adapted from Tiye and Gudeta. (2018). Indicators of training were adapted from Ariff et al. (2010). The indicators of contraceptives availability were adapted from Nara et al. (2020) and were adjusted to suit the context of the study. Table 3 shows a list of the items used.

Table 3. Measurement Model Results

Construct / Indicator	**Outer Loadings**
Logistics Management Information Systems (LMIS)	
LMIS makes it easier for our health facility to make requisitions according to client's requirements.	0.758
Customers' needs awareness for contraceptives has increased because of LMIS use in our health facility.	0.808
LMIS provides data reports on delivery of contraceptives for our health facility	0.729
Training	

Training of health care providers has increased their competence in providing the right information to our clients.	0.851
Guidance and counselling services to our clients has led to an increase in the requisitions for contraceptives	0.788
Contraceptives Availability	
Our health facility often visits the community to obtain information regarding their contraceptive needs.	0.778
Our health facility often changes distribution centres to make sure that they avail contraceptives to every client.	0.748
Commonly demanded contraceptives are always purchased in bulk to ensure continuity in serving our clients.	0.710
Our heath stores are always filled with multiple brands to ensure multiple choices by clients.	0.758
Our clients are always assisted in making their preferred requisition choices.	0.795

Analysis and the Results of the Study

Data analysis was carried out using SmartPLS software version 3.2.8 to obtain the partial least squares – structural equation modelling output (PLS-SEM). PLS-SEM has been used in this study because it has been proved to be an ideal tool in making proper interpretations of the results and thus simplifying decision making (Awang et al., 2015). According to hair et al. (2013), there are two outputs of PLS-SEM. The first one is the measurement model outputs that assess the validity and reliability of the study constructs and the second one is the structural model that assesses the model quality and the bootstrap results indicating the hypothesized relationships.

Assessment of the reflective measurement model

The measurement model of this study consisted of three variables: logistics management information system, training and availability of contraceptives. Multiple indicators measured each of the variables. All the variables had reflective measurements, as indicated by the arrows pointing from the variables to the indicators. Besides, given the fact that the indicators in this study are the manifestations of the constructs and at the same time have the same antecedents and consequences, and then it adopts the reflective measurement model (Jarvis et al., 2003). Indicator reliability was achieved with the outer loadings being at least 0.7 and the average variance extracted (AVE) being 0.5 minimum as indicated in Table 3 and 4 respectively (Hair et al., 2013). The internal consistency reliability was checked using composite reliability since its more reliable and with its coefficients higher than those of cronbach's alpha. Composite reliability values of > 0.70, shows that there is internal consistency of the instrument (Hair et al., 2006; Hair et al., 2013; Ringle et al., 2020). This study therefore used composite reliability to test for the internal consistency of the instrument as illustrated in Table 4 and was met.

Table 4. Assessment of Construct Reliability

Constructs	***Composite Reliability***	***AVE***
Contraceptives Availability	0.823	0.539
LMIS	0.808	0.586
Training	0.804	0.673

Assessment of construct Validity. To test discriminant validity of this study, the Heterotrait-Monotrait (HTMT) ratio of correlation was used. According to Henseler et al. (2015), HTMT is more ideal in testing discriminant validity because it provides less biased estimations of the correlations among the latent variables as compared to the traditional Fornell & Lacker (1981) criterion. Table 5 shows that the constructs of this study are empirically distinct from each other since the highest value of 0.473 is much smaller than 1 and also the bootstrapping routine results show that the upper confidence interval limits are below 1.

Table 5. HTMT Results

Latent Variable	*Contraceptives Availability*	*LMIS*
Contraceptives Availability		
LMIS	**0.515** $CI_{0.9}$([0.080, 0.367])	
Training	**0.631** $CI_{0.9}$ ([0.145,0.420])	**0.606** $CI_{0.9}$([0.176,0.520])

Assessment of the structural model

This study first tested for collinearity issues among the reflective indicators since high correlations are not desired between items in reflective measurement models before the assessment of the full model using the variance inflation factor (VIF). The VIF quantifies the severity of collinearity problems. According to Henseler et al. (2015), it is important to examine the PLS path model for collinearity issues to ensure that it does not bias the regression results. The accepted standard VIF values should be below 3 (Hair et al., 2019). During the VIF analysis, availability of contraceptives was considered as dependent variable while logistics management information systems and training are served as independent variables. The VIF results, summarized in Table 6, suggest that there are no indications of both collinearity and CMB issues between each set of independent variables since the VIF values are less than 3.

Table 6. Common Method Bias Results

Independent variable	**Dependent variable Availability of Contraceptives**	**CMB Problem (VIF > 3?)**
Logistics management information systems (LMIS)	1.281	No
Training	1.284	No

Table 7 presents the results of the structural model estimation and evaluation of the relationships among logistics management information systems, training and contraceptives availability in a developing country's context. The criterion for assessing a PLS structural model (Awang et al., 2015), for instance the coefficient of determination $(R2)$ for the relationship between logistics management information system (LMIS) and training has an acceptable but low value of 0.202. The value is above the acceptable thresholds hence signifying the model's predictive validity (Chin, 1998; Awang et al., 2015; Ringle et al., 2020). This analysis reveals that logistics management information systems and training explain only 20.2 % of total variations in the availability of contraceptives in public health facilities. The remaining 79.8 % is explained by

other factors outside our study. Consistent with these findings the results from the structural model through the blindfolding procedure show that the $Q2$ value of the study variables is 0.086, which is above zero, thus indicating the predictive accuracy of the PLS path model (Henseler et al., 2015). H1 tested whether logistics management information systems (LMIS) influences availability of contraceptives in the public health sector. The bootstrapping results in Table 7, indicate that the direct effect (LMIS → AC) is significant H1[($\beta = 0.229$, $p < 0.05$, CI (0.080; 0.367)]. In addition, the direct relationship between training and availability of contraceptives as indicated in Table 7 is also significant and positive H2[($\beta = 0.280$, $p < 0.05$, CI (0.145; 0.420)].

Table 7. Evaluation of the structural model

No.	*Paths*	*B*	*T Statistics*	*P Value*	*CI 95%*
1	Logistics management information systems -> Availability of Contraceptive	0.229	2.593	0.005	[0.080, 0.367]
2	Training -> Availability of contraceptives	0.280	3.193	0.001	[0.145; 0.420]
		$Q2$	$R2$		
3	Availability of contraceptives	0.086	0.202		

Notes: Confidence intervals were computed based on the biased corrected 95% (one – tailed) test.

The cross-validated redundancy measure $Q2$ was derived from the blindfolding procedure; $R2$= Coefficient of determination.

Evaluation Results of Importance Performance Map Analysis

This study also extended the results of PLS-SEM by also taking into account the performance of each construct in explaining availability of contraceptives. This was done by the use of the Importance Performance Map Analysis (IPMA). The Importance Performance Map Analysis (IPMA) was used to evaluate the predecessor variables (Logistics management information systems (LMIS) and Training) that had a relatively high importance to the target variable (Availability of contraceptives) but which achieved a relatively low performance. These kinds of variables have a great value to those public health facilities seeking to enhance availability of contraceptives, but have limited resources (Adjei et al., 2015; Nara et al., 2020). Figure 2, below, displays the IPMA results for the predecessor variables of availability of contraceptives. The results reveal that logistics management information systems (LMIS) are of considerable importance (0.229) in availability of contraceptives in the public health sector. This is followed by training (0.280). These are the predecessor variables with a direct relationship to availability of contraceptives. The results indicate that a one-unit increase in the adoption and implementation of the logistics management information systems (LMIS) by public health facilities, increases availability of contraceptives by 0.229. Hence, managerial actions should prioritize improving the performance of LMIS in those facilities that have implemented the LMIS and implement them in those facilities where they are still lacking.

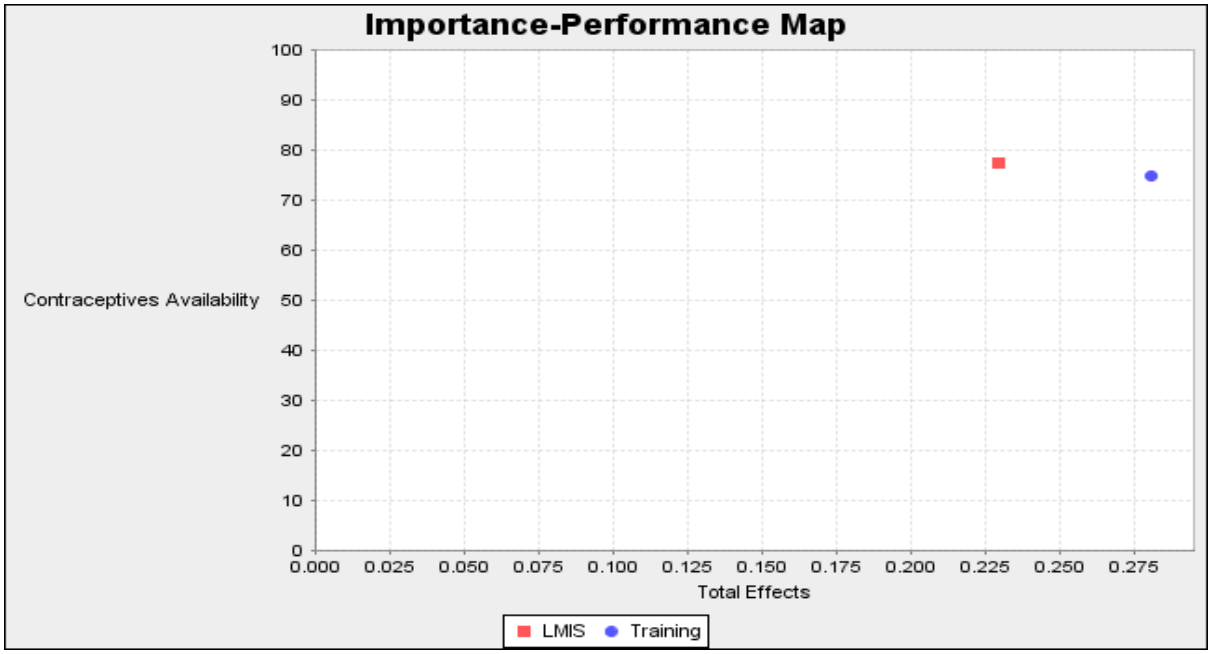

Figure 2. The Importance – Performance Map

Discussion of Findings

The findings from the study reveals a positive and significant influence between logistics management information and availability of contraceptives, thus H1 is supported H1[($\beta = 0.229$, $p < 0.05$, CI (0.080; 0.367)]. This result signifies that an improvement in the adoption of logistics management information systems leads to an improvement in the availability of contraceptives to clients in the public health sector. According to Tiye and Gudeta (2018), logistics management information systems, if well implemented helps to gather, analyse and validate data from all levels of the logistics system that can be used to make logistics decisions regarding availability of health care products to public health care facilities. The findings are consistent with those of Anjomshoae et al. (2017), who argue that LMIS if well implemented can increase availability of heath products through gathering accurate and unbiased data, analyse and validate it from all levels of the logistics system (supply and demand side). Subsequently, this improves logistics decision making thereby warranting constant availability of contraceptives and minimising the consequences of their unavailability such as school dropouts due to teenage pregnancies and government expenditure while trying to deal with these consequences. These results are also consistent with the predictions of the resource dependence theory (RDT), which assumes that public health facilities manage their dependencies in the face of uncertainty and that, as the demand for contraceptives become more stochastic and dependencies increase, public health facilities seek a logistics management information system that is capable of capturing accurate information and disseminate it to all the stakeholders to minimise stockout situations (Pfeffer & Salancik, 1978; Wudhikarn et al., 2018).

The findings further reveal a positive and significant influence between training and availability of contraceptives, thus H2 is supported H2[($\beta = 0.280$, $p < 0.05$, CI (0.145; 0.420)]. This means that an increase in training of staff on administering contraceptives and the use of LMIS leads to an increase in the availability of contraceptives in the public health sector. This signifies that training enables public health facilities to provide contraceptives which are demanded but lacked

experienced staff to provide them to clients, more especially the permanent contraceptives like vasectomy, castration and tubal ligation at health centre IIs. This is consistent with the previous scholars such as Jones (2005), Coe & de Beyer (2014), Wudhikarn et al. (2018) and Subramanian (2020) who argue that training of community distributors increases awareness in communities, that eventually improves requisitions from clients thereby improving their availability. Whereas previous studies (Moons et al., 2019; Subramanian,2020) noted that information sharing through the use of logistics management information systems and training of medical staff on how to use the system is critical to safeguarding product availability, this study has established that sometimes information from health centre IIs is not always given much attention and it could be the main reason they get supplied with contraceptives that are either about to expire or those that do not conform to the needs of their clients. This is because the government generalizes the needs of the clients; although, each public health facility has unique requirements that require individual attention.

Conclusions and Implications

From this study, we conclude that the public sector needs to improve on the installation and implementation of logistics management information systems, if possible, in all public health facilities. Logistics management information systems, if well implemented can aid in guaranteeing consistent availability of contraceptives through gathering accurate information, analysing and validating it from all levels of the logistics system. This leads to improved logistics decisions on how to consistently ensure availability of contraceptives and improve the quality of clients' care. The study also identified training of medical personnel on how to use LMIS as well as administering some of the commonly demanded contraceptives as an important aspect in guaranteeing constant availability of contraceptives in the public health sector. The government and the management of these public health facilities should therefore improve on the capacity building of the medical staff, through on-job trainings, refresher courses and encouraging vertical integration so that the few skilled personnel can train others. Implementing adolescent clinics should also be emphasised as a way of improving trainings to the medical personnel and increase awareness about the availability of contraceptives to the adolescents. As for areas for further research, future studies might need to consider comparing the influence of logistics management information system on availability of contraceptives looking at both the public and private sector. Future research might also consider investigating the influence of logistics management information systems (LMIS) on the availability of contraceptives comparing two or more developing economies.

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