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RESEARCH ARTICLE

CONTRIBUTION OF MOBILE PHONES AND RADIO IN DISSEMINATING, ACCESSING AND RETAINING SUGAR MARKET INFORMATION BY SUGAR COMPANIES, WESTERN KENYA.

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Abstract

The focus of the study was to determine the contributions of mobile phones and radio in disseminating, accessing and retaining sugar market information by millers in Western Kenya. The specific companies covered were Nzoia Sugar Company, West Kenya Sugar Company, and Butali Sugar Mill. The study population included employees of the corporations within the respective marketing departments, specifically managers. A randomly selected sample of 120 respondents was used on the basis of subgroups of each specific sugar company with equal representation. Stratified sampling was applied to treat the population into strata. Simple random sampling was applied to select individual respondents. Correlation research design was adopted to generate both qualitative and quantitative data. Questionnaires facilitated data collection after piloting instruments at Chemelil Sugar Company limited. The data was coded, edited and analyzed by descriptive and inferential statistics. A chi-square helped to establish differences in responses. The results were presented graphically in tables and charts. Evidently, mobile phones were commonly used in transmitting sale transactions through making calls, SMS, send or receive money, photography, videotaping and advertising. This tool influenced sugar sales positively with 16.7% reporting higher sales, 71.7% average sales, those not sure were 10.0%, while 0.8% realized low sales. Also, radio services had a significant influence with majority (85.0%) of respondents saying that radio services attracted more customers. Vernacular radio services were the most used in the dissemination and retention of sales information, followed by national radio services and finally international radio services. Accordingly, sugar companies have embraced technology and realized increased sales volumes and faster transaction speed.

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Introduction:-

In the world today the gap between supply and demand of sugar makes sugar marketing an essential sub-sector of agriculture (KSB, 2010). This accounts for the development of several global and regionalized marketing initiatives to manage agricultural marketing, particularly, sugar marketing (Stienen, Bruimas & Neuman, 2007). These include the Common Market for Eastern and Southern Africa (COMESA) and the Common Market Protocol initiated

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recently to serve East African Region (Bosco, 2010). The Kenya National Trading Corporation (KNTC) used to be in charge of sugar sales in Kenya. However, from the early 1990s, the sugar market underwent liberalization and the authority to control sugar sale transactions shifted to the Kenya Sugar Board (KSB, 2010). In addition, liberalization introduced high level of competition in sugar marketing by giving companies the freedom to sell sugar through channels of their choice. As a result, they adopted various approaches that include different agents, retailers and even individuals. According to KSB (2010), there are now more than 5,000 private wholesalers who buy sugar directly from the companies.

Apparently, a modern web knowledge system, fundamental understanding of all the target micro and macro-customers is the heart of successful marketing initiatives. It is attainable if marketers apply appropriate market information systems that define the entry and role of information and communication technology (ICT) in sugar marketing initiatives. Apparently, the role of ICT in agricultural marketing is increasingly gaining recognition across the world and was officially endorsed at the World Summit on the Information Society (WSIS) 2003-2005. This includes the use of computers, internet, geographical information systems (GIS), mobile phones, as well as traditional media like postal box, fixed telephone, fax machines, radio and televisions (Ozoemelem, 2009). In this regard, this study focused on determining the contributions of mobile phones and radio in disseminating, accessing and retaining sugar market information by millers in Western part of Kenya

Methodology:-

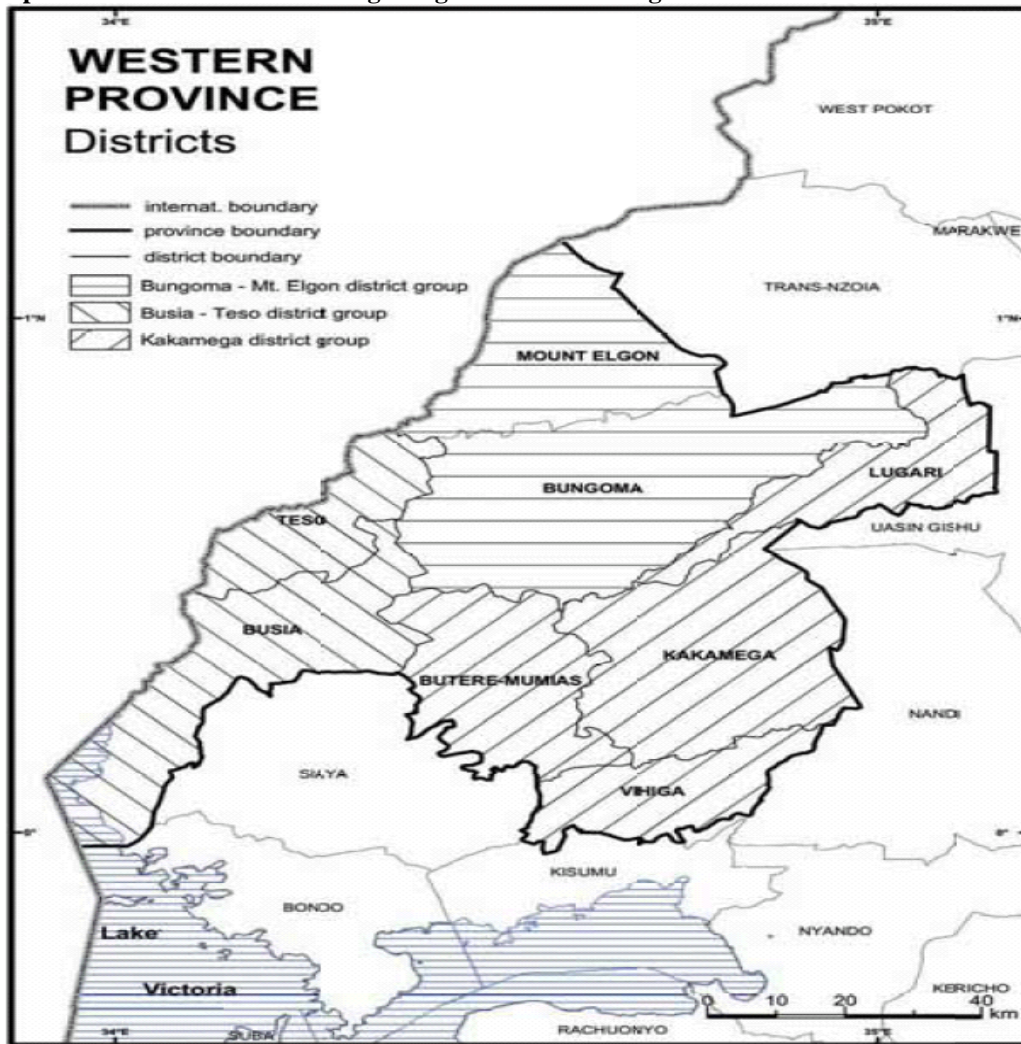
Study Area

The study was undertaken among the sugar companies in western province of the republic of Kenya. They included Nzoia Sugar Company limited found in Bungoma County and operating as a public company, and West Kenya Sugar Company limited and Butali Sugar Mill, both found in Kakamega County, operating as private entities. Kakamega County is a town lying about 30km north of equator, less than 100km North of Kisumu. The town lies between longitudes $34^{\circ} 32'$ and $35^{\circ} 57' 30''$ East of the prime meridian and latitudes $0^{\circ} 07' 30''$ to $0^{\circ} 15'$ north of the Equator (KCDDP, 2008).

Western region receives a higher annual precipitation and contains Kakamega forest, relic of tropical forest that stretched west through Uganda in the past. It is an agricultural area with 62% of the population participating actively in agricultural activities (KSB, 2010). Food crops grown include maize, beans, and millet, while cash crops include tobacco, coffee, sugar cane and cotton (MoA, 2011).

According to the 2009 census, Kakamega County has a total of 1,660,651 people (KNBS, 2010). West Kenya Sugar Company is 1½ km from Kambiri junction along Kakamega-Kaburengu-Webuye road, whereas Butali Sugar Mill is 500 m from Butali market along Kakamega-Kaburengu-Webuye road. On the other hand, Nzoia Sugar Company limited is found in Bungoma County of Western Kenya, 5km from Bukembe junction along Webuye-Bungoma road. The capital of the County is Bungoma town. It is located on latitude $0^{\circ} 38' N$ and $0^{\circ} 50' N$ and longitudes $34^{\circ} 25' E$ and $35^{\circ} 12' E$ with an altitude of 2000metres. Bungoma County is mainly agricultural, centering on sugarcane and maize cultivation. The county has fertile volcanic soils as it is just on the slope of Mt. Elgon and experiences high rainfall throughout the year (1800-3600mm), which is good for agriculture. The area is a home of several rivers, essential for small scale irrigation (MoA, 2011). Other crops grown in this region include vegetables (kales, cabbages, tomatoes, onions and indigenous vegetables), and sunflower. The county has an improved transport network system with tarmac roads, murrum roads and railway system that link up major factories (KNBS, 2009).

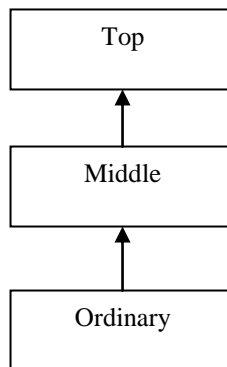
Map of Western Province Showing Bungoma and Kakamega Counties



Source: Kenya National Bureau of Statistics (2009)

Target population

The study targeted marketing departments of Nzoia, West Kenya Sugar companies, and Butali Sugar Mill. On this basis, therefore, each entity was treated as a sub-group or strata. A stratified sampling procedure was applied to treat the marketing department of each company as strata. Stratified sampling enhances representativeness in studies involving sub-groups of respondents (Kothari, 2007). The stratified sampling procedure equally applied to the employees within the marketing department, categorized as top, middle and lower level managers to ensure fair coverage of all employees as illustrated below.



Population selection within the strata was by simple random sampling, a method that gives equal opportunities to respondents (Kasomo, 2007)

Sample design and Size

The study population comprised sugar companies in western Kenya, divided into target population upon whom the findings of the study were generalized and an accessible population from whom, a sample of respondents was selected. The accessible population consisted of employees within Nzoia, West Kenya Sugar Companies and Butali Sugar Mill. Employees within the marketing department of these companies formed the sample frame from which the study sample was obtained. A correlation research design was adopted to establish the degree of relationship between two or more variables (Kothari, 2007). The study started with a pre-test at Chemelil Sugar Company, with a primary goal to explain the influence of ICT on sugar marketing by the three sugar companies mentioned above. The dependent variable was sugar marketing, while independent variables included the application of various ICT tools, specifically Mobile phone, Television, radio, and internet. Both qualitative and quantitative approaches were applied for systematic data gathering. According to ICD (2010), the use of complementary methods reveals discrepancies which a single approach cannot explain. Deductions were made from the data that was collected based on the theory that ICT influenced sugar marketing, and tried to verify the theories firmly held in mind

In this study, the sample respondents included a combination of personnel from marketing departments of Nzoia Sugar Company, West Kenya Sugar Company and Butali Sugar Mill. According to Borg, Gall & Joyce (2007), a minimum recommended size for each sub-group is 15 respondents for studies involving sub-groups, implying that engaging numerous respondents can yield superior or better findings.

On this basis, every one of the three sugar companies was treated as a sub-stratum in the study. Nzoia and West Kenya sugar companies had 45 respondents each, while Butali Sugar mill had 30 respondents since it is the smallest among the three entities. On the basis of the three sugar companies, a sample size of 120 respondents was used.

Data sources and collection method

Pre-tested, closed ended questionnaires were used to collect primary data from employees of the sugar companies. The questionnaires were easier to administer because each question item was followed by an alternative answers or choices for respondent to choose from. Kasomo (2007) considered them appropriate for data collection, stating that multiple choices help the researcher to regulate or control the range and depth of information to be provided by the respondents and recommended their use, adding that they are economical in terms of time and monetary expenses. Borg, Gall & Joyce (2007) recommended the tool because it is always in a form that is easily analyzable due to the presence of multiple choices. Basically, the questionnaires consisted items on ICT tools and services (internet, mobile phones, radio and financial transaction production), frequency of use and effectiveness of the application of these tools.

Secondary data was obtained from journals, annual reports, books and workshop proceedings. Similarly, the internet was a vital resource in accessing other relevant publications. Other secondary sources included reports from key sectors such as the Ministry of Agriculture, and Kenya Sugar Board.

Reliability Of Research Instrument

A research instrument is reliable if it measures what it purports to measure consistently. According to Kothari (2007), reliability of an instrument is a measure of the extent to which it yields consistent results or data after repeated trials in the study. The consistency of questionnaire to yield reliable data was established through a pre-testing process at Chemelil Sugar Company, located in Nyanza region. In line with the recommendations, a random sample of 5 top level managers, 15 middle level managers and 15 lower managers were used during the pre-testing process. Reliability tests were performed using the split half method. The instruments were found reliable; hence, adopted for use

Validity of the research instrument

The Validity of an instrument is a measure of the extent to which the instrument measures what it is meant or expected to measure (Kothari, 2007). A draft questionnaire was submitted to the experts in the department of sugar technology of Masinde Muliro University of Science and Technology who reviewed the contents for validity. They assessed and standardized each question item in relation to each objective to ensure relevancy and accuracy. Useful comments were incorporated to improve the effectiveness of the questionnaire

Data analysis

After data collection, information on the questionnaires was coded and entered into the SPSS package for processing and analysis using descriptive and inferential statistics. The data was presented using tables, charts and graphs where appropriate. The chi-square was used to analyze the use of ICT in sugar marketing. Spearman’s Rank order correlation was calculated between variables to establish similarities or differences between various rankings. The correlation was obtained using a formula:

$$r = 1 - \frac{6\sum D^2}{N\sqrt{N^2-1}}$$

The standard error of the correlation was obtained using the formula:

$$S.E._r = \frac{1-r^2}{\sqrt{N}}$$

The correlation coefficient computed between variables was interpreted by comparing its magnitude with its probable error, obtained using a formula:

$$P.E._r = 0.6745 \frac{1-r^2}{\sqrt{N}}$$

Where:

P.E._r = Probable Error

r = Coefficient of correlation, and

N = the number of pairs or observations used in derivations of r.

D = Differences between ranks

When $r < P.E._r$ there is no evidence of correlation, meaning the value of r is not significant ($P > 0.05$). On the other hand, when the value of $r > 6 P.E._r$ the coefficient of correlation is practically certain ($P < 0.05$) (Gupta, 2008).

Results And Discussion:-

Contribution of mobile phones and radio services to disseminate, access and retain sugar market information

The study sought to examine the use of mobile phones and radio services in the dissemination and retention of sugar market information

Use of mobile phone services in sugar sales transactions

This section looked at how sugar companies use mobile phone services in sugar sales transactions. It looked at frequency in the use of mobile services in sugar transactions, effectiveness of the mobile services and their effect on sugar sales. The respondents were assessed on the following food security criteria:

Regularity in the use of mobile services in sugar sale transactions

The study sought to establish how frequent mobile services were used in sugar sales transactions. The results are summarized in Figure 1 below

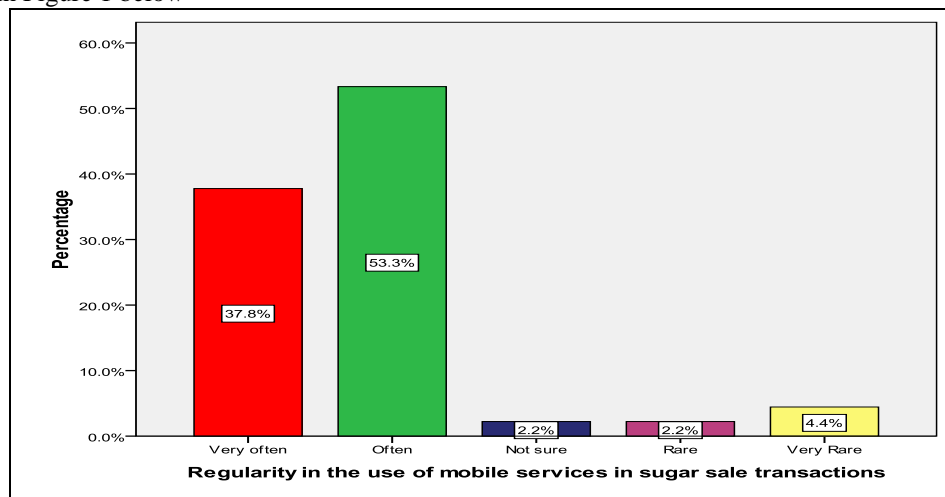


Figure 1:-Regularity in the Use of Mobile Services By Marketing Departments of Nzoia, West Kenya and Butali Sugar Mill

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 123.00$). 37.8% of respondents used mobile services more often, 53.3% often, 2.2% were not sure, 2.2% rarely used mobile services, while 4.4% used mobile phones very rarely. From these findings, mobile phones were a common tool for transmitting sugar sale transactions as majority (89.1%) commonly used mobile phones for these transactions.

Table 1:-Cross-tabulation for Company vs. Regularity in the use of mobile services by marketing departments of Nzoia, West Kenya and Butali Sugar Mill

Company		How often does your company use mobile services in sugar sale transactions				
		Very often	Often	Not sure	Rare	Very Rare
Nzoia	Frequency	12	15	2	0	1
	% within Company name	40.0%	50.0%	6.7%	0.0%	3.3%
West Kenya	Frequency	6	24	0	0	0
	% within Company name	20.0%	80.0%	0.0%	0.0%	0.0%
Butali	Frequency	16	9	0	2	3
	% within Company name	53.3%	30.0%	0.0%	6.7%	10.0%

A Chi Square test of $\chi^2_{8,0.01} = 23.096$ indicate a highly significant ($p < 0.01$) dependence between companies and use of mobile services. Results show that 40.0% of Nzoia sugar staff used mobile services very often, 50.0% often, 6.7% not sure and very rare was represented by 3.3%. For West Kenya, 20.0% used mobile services very often and 80.0% often. Not sure, rare and very rare were all represented by 0.0%. For Butali Sugar, very often was represented by 53.3%, often 30.0%, not sure 0.0%, rare 6.7% and very rare 10.0%.

Table 2:-Cross-tabulation for Position vs Regularity in the use of mobile services by marketing departments of Nzoia, West Kenya and Butali Sugar

Position		How often does your company use mobile services in sugar sale transactions				
		Very often	Often	Not sure	Rare	Very Rare
Top Manager	Frequency	12	16	0	0	3
	% within Position	38.7%	51.6%	0.0%	0.0%	9.7%
Middle Level Manager	Frequency	14	16	2	2	1
	% within Position	40.0%	45.7%	5.7%	5.7%	2.9%
Ordinary Staff	Frequency	8	16	0	0	0
	% within Position	33.3%	66.7%	0.0%	0.0%	0.0%

A Chi Square test of $\chi^2_{8,0.05} = 10.837$ indicate a highly significant ($p < 0.05$) dependence between companies and use of mobile services. From the results, 38.7% of top managers used mobile services very often, 51.6% often, 0.0% not sure, 0.0% rarely and 9.7% very rarely. For middle level managers, 40.0% used mobile services very often, 45.7% often, 5.7% not sure, 5.7% rarely and 2.9% very rarely. For ordinary staff, 33.3% used mobile services very often, 66.7% often while not sure, rare and very rare were represented by 0.0%.

Regularity In The Use Of Specific Mobile Services

The section looks at how frequent companies use the following specific mobile services: SMS, phone call, sending money, receiving money, photography, video taping and advertising.

Table 3:-Frequency in the use of SMS by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

Response	Frequency	Percent
Very Frequent	64	53.3
Frequent	36	30.0
Not Sure	5	4.2
Rare	8	6.7

Very Rare	7	5.8
Total	120	100.0

A Chi Square test conducted on the responses showed that there was a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 110.417$). Results in Table 3 indicate that 53.3% were of the view that SMS was used very frequently, 30.0% frequently, 4.2% were not sure while rare and very rare were represented by 6.7% and 5.8% respectively. This was an indication that majority of respondents commonly used SMS for sugar sale transactions. These findings agree with those of Stienen, Bruimas & Neuman (2007) who noted that short messages and text services have taken up and effectively delivered prices and trading information via mobile phone to farmers. The set up of price and market information systems increase processes. For example, in Ghana, IICD supports the social enterprise foundation of West Africa in linking rural soybean producers to mills through the use of mobile phones, satellites and databases (Bruinsma, 2007).

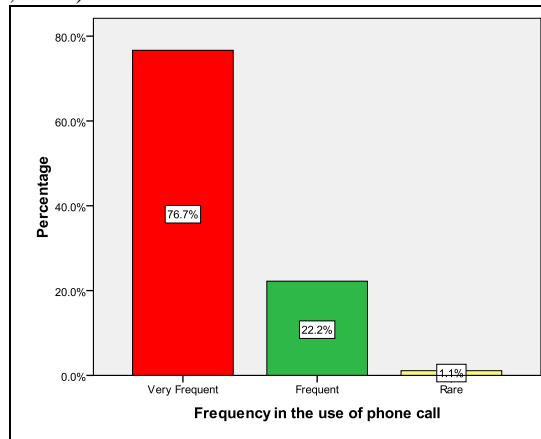


Figure 2:-Frequency In The Use Of Phone Calls By Marketing Departments Of Nzoia, West Kenya And Butali Sugar Mill

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{2,0.05} = 108.60$). The results indicated that 76.7% used phone calls very frequently, 22.2% used it frequently and those who were not sure were 1.1%. These results imply that almost all respondents frequently used mobile phones to disseminate and retain sugar market information.

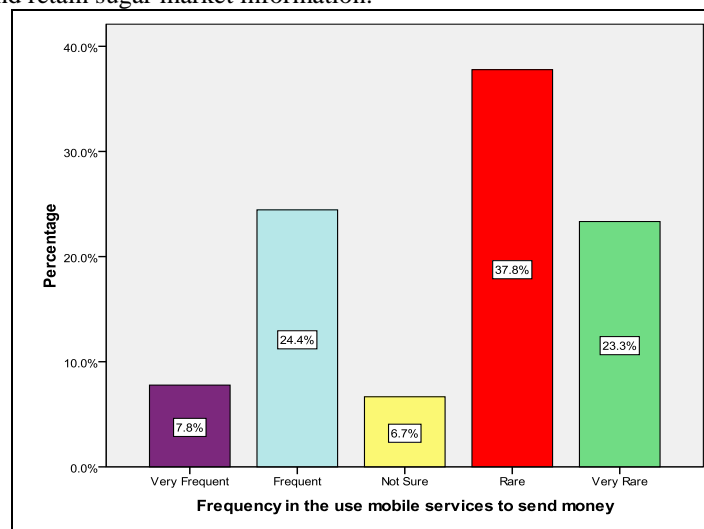


Figure 3:-Frequency in the use of mobile services to send money by marketing departments of Nzoia, West Kenya and Butali Sugar Mill

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 30.58$). Results in Figure 3 indicate that 7.8% used mobile services to send money very frequently,

24.4% used it frequently, 6.7% were not sure, 37.8% used it rarely, while 23.3% used it very rarely. This indicated that majority of respondents (55.9%) rarely used mobile phones to send money involving sales.

Table 4:-Frequency in the use of mobile services to receive money by marketing departments of Nzoia, West Kenya Butali Sugar Companies

Response	Frequency	%
Very Frequent	6	5.0
Frequent	29	24.2
Not Sure	15	12.5
Rare	44	36.7
Very Rare	26	21.7
Total	120	100.0

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 34.75$). Results in Table 4 indicate that those who used mobile services to receive money very frequently were 5.0%, 24.2% used it frequently, 12.5% were not sure, 36.7% used it rarely, while 21.7% used it very rarely. This indicates that only a small proportion of respondents (29.2%) used mobile services to receive money from sales transactions.

Table 5:-Frequency in the use of mobile services for photography by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

Response	Frequency	%
Very Frequent	1	0.8
Frequent	6	5.0
Not Sure	17	14.2
Rare	60	50.0
Very Rare	36	30.0
Total	120	100.0

A Chi Square test conducted on the responses showed that there was a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 97.58$). Results in Table 5 indicate that those who used mobile services for photography very frequently were 0.8%, those who used it frequently were 5.0%, 14.2% were not sure, 50.0% used it rarely while 30.0% used it very rarely. The results indicate that majority of respondents did not use mobile phones for photography.

Table 6:-Frequency in the use of mobile services for videotaping by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

Response	Frequency	%
Very Frequent	1	0.8
Frequent	2	1.7
Not Sure	23	19.2
Rare	51	42.5
Very Rare	43	35.8
Total	120	100.0

A Chi Square test conducted on the responses at 5% level of statistical significance showed that there was a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 87.667$). Results in Table 6 indicate that those who used mobile services for videotaping very frequently were 0.8%, those who used it frequently were 1.7%, those who were not sure were 19.2%, 42.5% used it rarely while 35.8% used it very rarely. This implies that only a small proportion (2.5%) of respondents frequently used mobile phones for videotaping.

Table 7:-Frequency in the use of mobile services for advertisement by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

Response	Frequency	%
Very Frequent	19	15.8
Frequent	3	2.5

Not Sure	16	13.3
Rare	34	28.3
Very Rare	48	40.0
Total	120	100.0

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 50.25$). Results in Table 7 indicate that those who used mobile services for advertisement very frequently were 15.8%, those who used it frequently were 2.5%, 13.3% were not sure, 28.3% used it rarely, while 40.0% used it very rarely. It is clear from the results that only few (18.3%) respondents advertise frequently using mobile phones.

The results are consistent with those of Etzo & Collender (2010), who established that the role of mobile phones in maintaining customer's linkages is clear. They further established that in most business organizations, mobile phones are more often used for sustaining client linkages than any other form of ICT.

Effect of application of mobile services on sugar sales

The study sought to establish how the application of mobile services affected sugar sales. The results are recorded in Figure 4

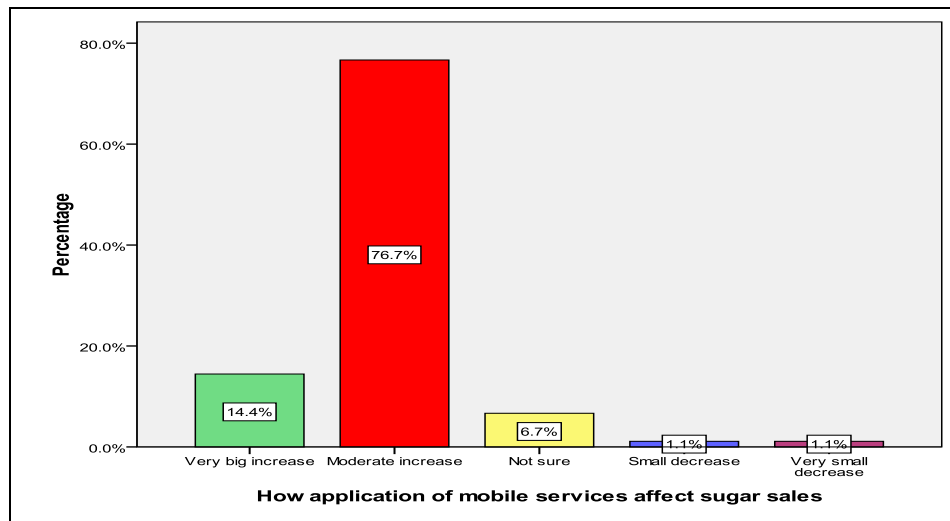


Figure 4:-Effect of application of mobile services by marketing departments of Nzoia, West Kenya and Butali Sugar Companies on sugar sales

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 210.917$). Results in Figure 4 show that those who reported a very big increase were 14.4%, moderate increase were 76.7%, those who were not sure were 6.7%, while those who reported a small decrease and very small decrease were each having 1.1%. The results imply that majority of the respondents reported an increase in sugar sales, following the application of mobile services in sugar sales transactions.

These findings agree with those of Guislain et al. (2006), who established that increasing the efficiency, productivity, marketing and sustainability of small scale agricultural enterprises is an area ICT can make a significant contribution. He further established that key improvements in agricultural marketing stem from information about early warning systems transmitted through ICT. Recent mobile banking initiatives offer further scope to reduce costs and stimulate local trade (Haag et al., 2006).

Use of radio services in sugar sales transactions

The study sought to determine how sugar companies used radio services to disseminate and retain sugar market information.

Frequency in the use of radio services in sugar sales transactions

Respondents were asked to state how often their companies used radio services to establish how frequent companies used radio services in sugar sales transactions. The results are given in Table 8.

Table 8:-Regularity in the use of radio services in sugar sale transactions by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

Response	Frequency	%
Very often	15	12.5
Often	83	69.2
Not sure	6	5.0
Rare	6	5.0
Very Rare	10	8.3
Total	120	100.0

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 183.58$). From Table 8, very often use of radio services was represented by 12.5%, often use by 69.2%, not sure and rare use were each 5.0%, while very rare use were 8.3%. This implies that radio was a tool commonly used by companies to disseminate and retain sugar market information.

Frequency In The Application Of Radio Services In Sugar Sales Transactions

The study sought to determine how often companies apply mobile services in advertising and applying market information.

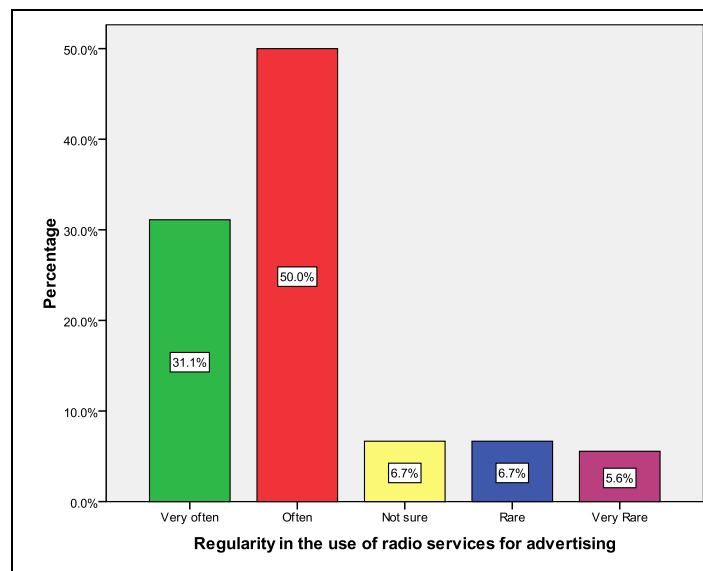


Figure 5:-Frequency in the use of radio services by marketing departments of Nzoia, West Kenya and Butali Sugar Companies for advertising

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 77.08$). From the results in Figure 5, very often use of radio services for advertising was represented by 31.1%, often use by 50.0%, not sure were 6.7%, rare use were 6.7%, while very rare use were 5.6%. The results indicate that radio was a tool commonly used for advertising purposes.

Table 9:-Use of radio services by marketing departments of Nzoia, West Kenya and Butali Sugar Companies in spreading price information

Response	Frequency	%
Very often	15	12.5
Often	68	56.7
Not sure	12	10.0

Rare	20	16.7
Very Rare	5	4.2
Total	120	100.0

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 105.75$). according to the results in Table 9, very often use of radio services in spreading price information was represented by 12.5%, often use by 56.7%, not sure were 10.0%, rare use were 16.7%, while very rare use were 4.2%. The results indicate that the radio was a major tool for spreading price information. According to Haag et al. (2006), while radio has the obvious limitation of being restricted to sound- proponents of radio advertising to often cite this as an advantage. Most radio programmes are broadcast in the local language, thus, allowing radio audience, which is generally illiterate to follow nearly all of the programming. Therefore, radio services are valuable in improving producers' agricultural income, by distributing commercial information. The information broadcast by each radio station is contained in a summary file that is processed by market researchers (Jordan et al., 2009)

Type of radio stations used by companies

The study sought to determine the type of radio stations used by companies to disseminate and retain market information. To achieve this, respondents were asked whether they used national, vernacular or international radio services.

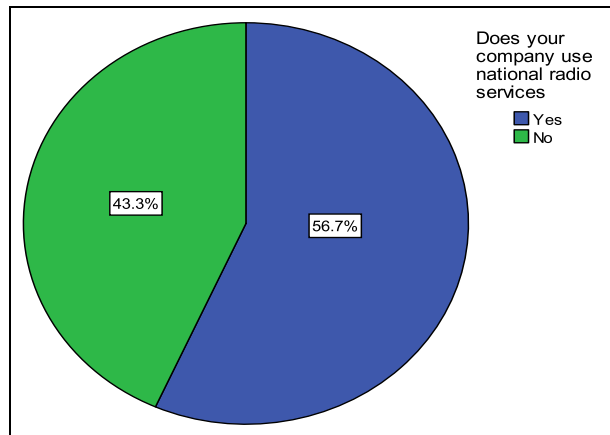


Figure 6:-Use of national radio services by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{1,0.05} = 7.50$). Results in figure 6 indicate that majority of respondents (56.7%) agreed that their companies used national radio services, while a few (43.3%) said that national radio services were not being used.

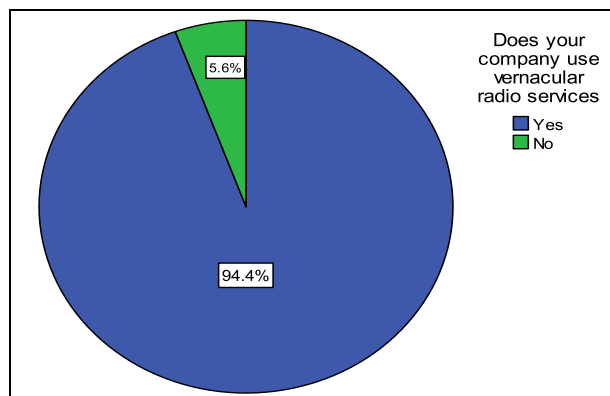


Figure 7:-Use of vernacular radio services by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

A Chi Square test conducted on the responses showed that there was a highly statistically significant ($P < 0.01$) variation ($\chi^2_{1,0.05} = 93.63$). From the responses in Figure 7, it is evident that vernacular radio services were highly used in dissemination and retention of sugar market information. A majority of respondents (94.4%) agreed that they used vernacular radio stations while very few (5.6%) disagreed. Since most villages have radio sets, these broadcasts are actually heard by farmers (Tounessi, 2010). Rural radio stations are neighborhood radio stations that are specialized in the distribution of information concerning the rural world. They broadcast in FM exclusively and are thus, very pleasant to listen to, making them favorite in spreading market information to the locals.

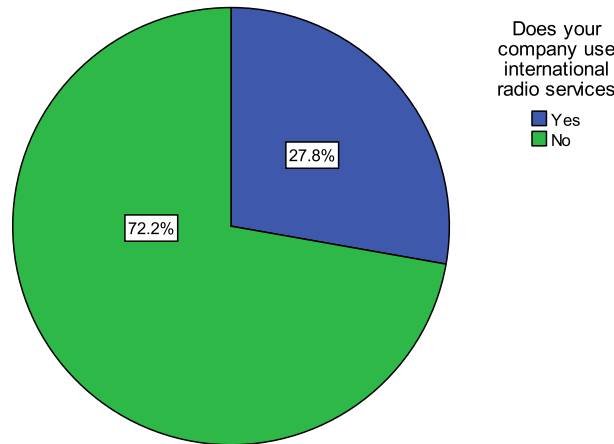


Figure 8:-Use of international radio services by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{1,0.05} = 30.00$). From Figure 8, 27.8% said that international radio services were being used by their companies, while 72.2% said that international radio services were not being used by their companies. From the above results, it becomes clear that vernacular radio services are the most commonly used for dissemination and retention of sugar sales information, followed by national radio services, while the use of international radio services is on the trail. According to Jordan et al. (2009), most radio programmes are broadcasted in the local language, thus allowing the radio audience, which is generally illiterate, to follow nearly all of the programming. Therefore, radio services are valuable in improving producers’ agricultural income by distributing commercial information. The information broadcast by each radio station is contained in a summary file processed by market researchers.

Effectiveness of radio services in sugar marketing

The study sought to establish the effectiveness of national, vernacular and international radio services in sugar marketing. The results are given below:

Table 10:-Effectiveness of national radio services in sugar marketing by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

Response	Frequency	%
Very effective	64	53.3
Effective	48	40.0
Not sure	8	6.7
Total	120	100.0

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{2,0.05} = 41.60$). Results in Table 10 indicate that 53.3% of respondents cited national radio services as being effective, 40.0% said that it was effective, while 6.7% were undecided/ not sure. From the results, majority of the respondents were of the view that national radio services were effective in sugar marketing.

Table 11:-Effectiveness of vernacular radio services in sugar marketing by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

Response	Frequency	%
Very effective	26	21.7

Effective	78	65.0
Not sure	12	10.0
Ineffective	3	2.5
Very Ineffective	1	0.8
Total	120	100.0

A Chi Square test conducted on the responses showed that there was a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 168.08$). From Table 11, those who said that vernacular radio services were very effective 21.7%, effective were 65.0%, not sure was represented by 10.0% while ineffective and very ineffective was represented by 2.5% and 0.8% respectively. It is evident that majority of the respondents were of the view that vernacular radio services were effective in sugar marketing.

Table 12:-Effectiveness of international radio services in sugar marketing by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

Response	Frequency	%
Very effective	19	15.8
Effective	9	7.5
Not sure	52	43.3
Ineffective	15	12.5
Very Ineffective	25	20.8
Total	120	100.0

A Chi Square test conducted on the responses showed a highly statistically significant ($P < 0.01$) variation ($\chi^2_{4,0.05} = 46.50$). From Table 12, 15.8% said that international radio services were very effective, 7.5% were effective, not sure was represented by 43.3%, while ineffective and very ineffective was represented by 12.5% and 20.8% respectively. From the results, majority of the respondents cited international radio services as not being effective in sugar marketing. This is likely due to the fact that international radio services are listened to by very few people, compared to national and vernacular radio stations.

From the findings, it is therefore clear that national and vernacular radio stations are more effective, compared to international radio services. In this regard, national and vernacular radio stations are commonly used, but international radio services are not. Further investigations indicated that most of the sugar produced by the companies is sold locally, courtesy of national and vernacular radio stations.

How radio services influence customers

The study sought to determine how radio services influenced customers. The results are given below.

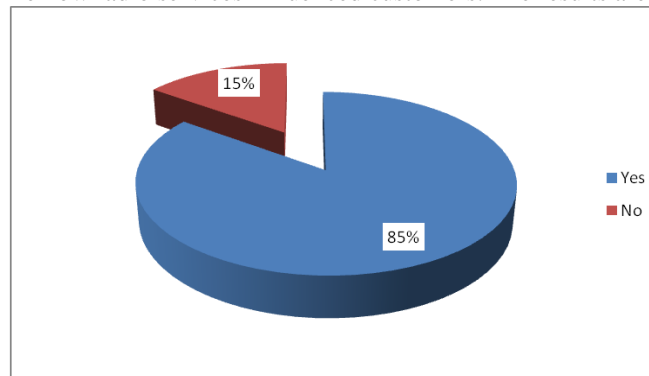


Figure 9:-Attraction of more customers by radio services by marketing departments of Nzoia, West Kenya and Butali Sugar Companies

A Chi Square test conducted on the responses at 5% level of statistical significance on the regularity in the use of radio services showed a highly statistically significance ($P < 0.01$) variation ($\chi^2_{1,0.05} = 58.80$).

Results in Figure 4.3 indicate that majority (85.0%) of respondents said that radio services attracted more customers while 15.0% said that they did not attract more customers.

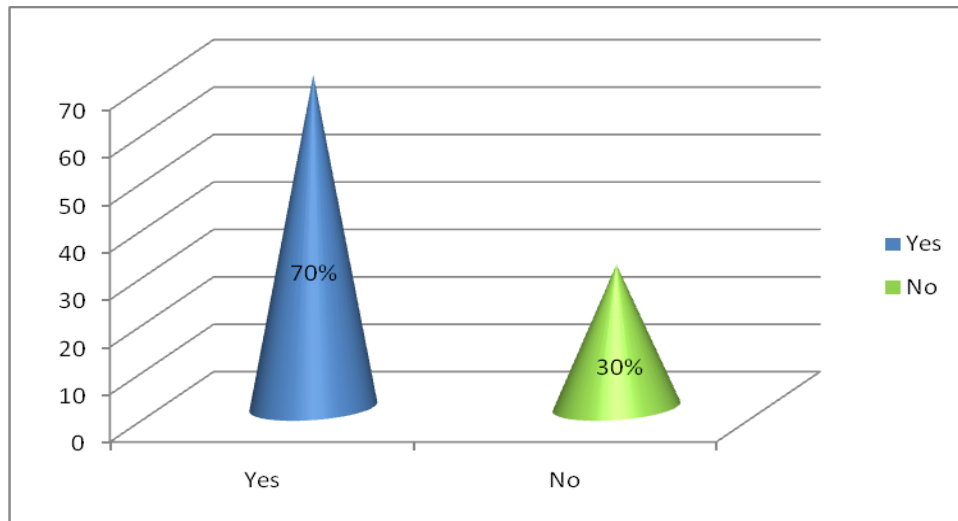


Figure 10:-Retention of customer base by radio services

A Chi Square test conducted on the responses at 5% level of statistical significance on the regularity in the use of radio services showed a highly statistically significance ($P < 0.01$) variation ($\chi^2_{1,0.05} = 19.20$).

The results (Figure 4.4) indicate that 70.0% of respondents were of the view that the use of radio services in marketing helps to retain the customer base, while 30.0% opposed this view.

The results above agree with those of Elliott (2010), whose findings showed that most consumers and producers demonstrated their satisfaction at being provided with price information through radio services. The broadcasting of marketing information by radio stations has become a much appreciated operation. In particular, it has raised the producers' level of dynamism, among the other actors in the market.

Table 13:-Summary of Chi Square on relationship of mobile and radio services and sugar sales promotion

Use of mobile and radio services	χ^2	P
Regularity in use of mobile services in sugar sale transactions	123.00	0.000**
Effect of application of mobile services on sugar sales	210.92	0.000**
Regularity in use of mobile services in sugar sale transactions	183.58	0.000**
Influence of radio services in attracting more customers	58.80	0.000**
Influence of radio services in retention of customer base	19.20	0.000**

****Highly significant variation (p<0.01)**

The results indicated that there were significant variations in the application of radio and mobile services in the promotion of sugar sales information. Radio and mobile services were found to be widely applied in the promotion of sugar sales, attraction of more customers, as well as retaining the customer base. The results are in agreement with those of Bruinsma (2007), who established that in Ghana, the Social Enterprise Foundation of West Africa was linking rural soya bean producers to mills through mobile phones, satellites and databases. The results are also in agreement with those of Etzo & Collender (2010), who established that the role of mobile phones in maintaining customer linkages was very clear. He further noted that in most business organizations, mobile phones were more often used for sustaining client linkages than any other forms of ICT. Tounessi (2010) also observed that since most villages have radio sets, these broadcasts are sometimes done in the local language, thus become pleasant to be listened to by most farmers.

Conclusion and Recommendations:-

Mobile phones were a common tool for transmitting sugar sale transactions. Results on the application of mobile services indicated that majority of respondents used mobile services to make calls and send SMS. A considerable proportion used mobile services to send and receive money, while only few respondents used mobile services for photography, videotaping and advertising. The results further showed that application of mobile services influenced sugar sales positively. Moreover, the results indicated that radio services were widely used in advertising and spreading price information. Vernacular radio services were the most commonly used for dissemination and retention of sugar sales information, followed by national radio services, while the use of international radio services was on the trail. Moreover, national and vernacular radio stations were found to be more effective compared to international radio services. The findings indicated that vernacular radio stations were commonly used in marketing followed by national radio stations. However, the use of these stations majorly targeted the local market. Accordingly, it is recommended that companies embrace the use of international stations to widen their market base.

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