

THE ROLE OF INFORMATION SYSTEMS IN ENHANCING THE PERFORMANCE OF THE PHARMACY COUNCIL OF GHANA

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ABSTRACT

Information systems present great potential for public institutions in developing countries to reengineer their processes, meet the current global trends and improve performance. This study describes the role of information systems in enhancing the performance of the Pharmacy Council of Ghana. Primary data was collected through semi-structured questionnaires. Questionnaires were administered to two groups; pharmacy operators that have been licensed by the Pharmacy Council and staffs from all the eight offices of the Pharmacy Council of Ghana. Presented in the analyses are the current information systems environment of the Pharmacy Council; the value of information systems as perceived by the Pharmacy Council staff and pharmacy operators; and respondent views on challenges facing the use of information system at the Pharmacy Council. Results from this study suggest that the Pharmacy Council has potential for computerization. Results further suggest that level of experience and exposure to computerization has significant level of influence on perceptions about computerization. Results also suggest major concerns about the availability of dedicated expertise to manage and maintain an information infrastructure at the Pharmacy Council. Results propose that the Pharmacy Council should examine all frequently recurring services and formulate strategies for computerization.

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KEYWORDS: Pharmacy Operators, Information System, Information and Communication Technology, Client Service, Public Institutions

INTRODUCTION

Institutions would ideally want to take decisions which are accurate and timely (Huber, 1990). Coming out with decisions largely depend on the information that is available and when it is made available (O'Reilly, 1982). Thus, data must be processed accurately and timely and must be easily accessible when needed. Information systems are actively adapted to process data. The benefits inuring from making good decisions as a result of the proper implementation of an information system (I.S.) could be a competitive advantage for an institution (Porter & Millar, 1985). The business value of I.S. has received considerable interest from the business community due to the increased realization that it potentially improves productivity and has significant impact on business performance (Brynjolfsson, 1993; Brynjolfsson & Hitt, 2000; Davenport & Short, 2003). For most organisations information systems has changed the way in which they conduct business. Perception of information systems as a strategic way of enhancing or improving the efficiency of businesses is not exclusive to developed countries (Castells & Development, 1999; Diagnostic, Foster, & Briceño-Garmendia, 2010). The Government of Ghana (GoG) also recognizes the importance of information technology to improve the service delivery of public institutions (Gyamfi, 2005; Heeks, 2002a, 2002b; Martey, 2004). To this effect, the GoG developed a policy document for the country, the Ghana ICT for Accelerated development (ICT4AD), in 2003. In this policy

document government seeks to deploy information systems to help improve service delivery by civil and public institutions to the public (Dzidonu, 2003; Policy, 2003).

Although the use of Information systems is increasing in Ghana, it does not mean that all organisations especially public institutions are able to derive value from it. But regardless of this, organisations continue investing in IS. It can be also seen that most of these organisations have computers and other forms of information technology but how are these being used within the organisation to enhance their operations? How is information systems and IT being implemented in public organisations to assist in data gathering and processing within the organisations to help them achieve these objectives?

The Government of Ghana acknowledges this in its policy document that the mere deployment of ICTs within public sector organizations and institutions does not necessary translates into improvements in productivity, efficiency and service delivery which collectively could impact on the overall developmental process of the country. The GoG suggests that, the deployment of ICTs within public institutions and business organizations and entities will have little or no impact on the nation's development process if not accompanied by a number of organizational and procedural changes as well as changes in attitude to work and work ethics (ICT4AD pg. 41). So the question here is, are public organisations moving in line with the government of Ghana's policy objectives as outlined for them in the ICT4AD? Another reason why organisations may not derive the business value of information systems in organisations is embedded in the phenomenon that information systems create business value indirectly but create business costs directly, making the value of information systems and the benefits thereof difficult for organizations to perceive.

The Pharmacy Council as a government institution has computers and other forms of IT equipment at their disposal. They could be used to enhance the service delivery of the PC by improving on their service delivery capacity. This study explored the prospects and challenges of using information systems in government institutions in Ghana. In this study, we assessed the role of IS in enhancing the performance of the PC of Ghana in managing client information by identifying the current IS in operation, determining the human resource capacity available at the Pharmacy Council for operating information systems and soliciting views on the perceived value and challenges of IS from both staff and clients of the PC. This paper has been organised into six major sections. The first section is an introduction to the study. The second is literature review relevant to the discussion. The third section describes the methods used in the study. The fourth section elucidates results and discussions from the study. The fifth section concludes the study. The sixth section provides references to literature reviewed and the final section is a biography of the authors of this document.

LITERATURE REVIEW

An Information System (I.S.) could be described as the processes of collecting and analysing data in a function area using electronic tools, applications programming and implementation, data mining, and decision support systems (Alter, 1998; Ruiz, Mejia, & Kaplan, 2003). In a broader sense, the term Information Systems is used not to refer only to the information and communication technology that an organization uses, but also to the way in which people interact with this technology in support of processes. Within an organisational context I.S. commonly aims to support operations, management and decision making (Melville, Kraemer, & Gurbaxani, 2004). The time and process of gathering data in an organisation and transforming it into information is vital for making important decisions. This is because accurate and timely information is necessary to help organisation meet their set objectives (Daft & Lengel, 1986; Day, 1994; Lee, Strong, Kahn, & Wang, 2002; Naumann & Rolker, 2000). Information systems generally are classified into five categories: office information systems, transaction processing systems, management information systems, decision support systems, and expert systems (Joseph, 2013). However, it is difficult to classify a system as belonging exclusively to one of the five information system types mentioned owing to the reason that organizations increasingly are consolidating their information needs into a single,

integrated information system. The impact of information systems on the performance of end users and the relationship between information systems and performance and productivity is of great interest to many researchers (Davis, 1993; Delone & McLean, 2003; Igbaria & Tan, 1997; Ravichandran & Lertwongsatien, 2005). While various studies have identified key factors for the success of information systems, other studies have been undertaken to measure the impact of I.S. on management performance of business organizations using different key performance indicators. Some studies have investigated the effects of a specific system performance of the user. These studies have established very important conclusions on the use of the system, system quality and reliability.

DATA AND METHODOLOGY

The study was conducted among staff in all ten (10) regions of the Pharmacy Council of Ghana. The study also included one hundred and thirty six (136) conveniently sampled from an alphabetically order list of four hundred and twenty (420) pharmacies registered with the Pharmacy Council in the Ashanti Region. With regards to the selection of pharmacy operators, factors of proximity, availability and willingness to participate were key determinants. Also, the sample excluded other pharmaceutical service providers such as licensed over the counter medicine sellers. This may place limitations on the extent to which this study can be generalized within the context of the Ghanaian pharmaceutical service providers. However, since activities do not vary within the organization there may not be wide deviations from what pertains with other service providers. Primary data was collected through structured interviews. Questionnaires were designed for this purpose with with a mix of closed-ended and open-ended survey questions. Reliability and validity of questions were assessed by repeating some questions. Questionnaires were interviewer-administered to staff of the pharmacy council on one hand, and managers and owners of the pharmacies on another. *Microsoft Excel Spreadsheet 2007* was used to analyse frequencies and percentages of closed end responses. Regression and logistic regression analysis were performed with *STATA 12*. Open-ended qualitative responses were through data reduction and conclusion creation.

RESULTS AND DISCUSSION

Socio-Demographics

Summary statistics on the socio-demographic characteristics of respondents from the Pharmacy Council staff are presented in Table 1. The summary statistics show the distribution of the respondents by sex, age grouping, regional office, department, position, level of computer knowledge/experience and access to use a computer at the department. Also presented are the percentage proportions for the distributions, relative to the total number of respondents. The age distributions are presented in six groupings, each with a ten year range up till age sixty and above. Results from Table 1 indicate that majority (67.74%) of staff respondents are males. This suggests that the number of male staff is more than twice the number of female staff at the Pharmacy Council. Results on the age distribution of staff respondents indicate that the ages of most of the staff respondents range from thirty (30) to forty (59) years. The age distribution of respondents from the Pharmacy Council staff reflects majority of the workforce fall within the active age of workers in Ghana. The distribution of staff respondents by the regional offices where they work, as presented in Table 1, indicate that over fifty per cent of staffs interviewed are located in the Greater Accra region. The very high number of responses from the Greater Accra region was because this region has two Pharmacy Council offices; the Greater Accra regional office and the head office. Responses from both the Greater Accra regional office and the head office were combined. With regards to distribution by departments, (49.11%) of the respondents were at the inspectorate department. The twelve staffs under the inspectorate department are distributed among the regions. All other departments however are at the head office of the Pharmacy Council. Results on the position/rank of staff also indicate that (47.83%) of the respondents held managerial positions. The number of managers interviewed was high because almost all managers at each regional office were respondents.

Table 1: Socio-Demographic Characteristics of Pharmacy Council Staff

Panel A: Sex Distribution		Staff of the Pharmacy Council	
	n	%	
Male	21	67.74	
Female	10	32.26	
Missing	1	3.13	
Panel B: Age Grouping		Staff of the Pharmacy Council	
	n	%	
20-29 years	3	9.68	
30-39 years	12	38.71	
40-49 years	9	29.03	
50-59 years	7	22.58	
60 years and above	0	0.00	
Missing	1	3.13	
Panel C: Distribution of by Region		Staff of the Pharmacy Council (N=23)	
	n	%	
Eastern	4	12.90	
Ashanti	4	12.90	
Western	2	6.45	
Northern	1	3.23	
Volta	3	9.68	
Greater Accra	17	54.84	
Missing	1	3.13	
Panel D: Distribution by Department		Staff of the Pharmacy Council (N=23)	
	n	%	
Inspectorate	14	49.11	
PPME	4	14.29	
MIS&P	3	10.71	
R & L	2	6.25	
Accounts	4	14.29	
ETD	1	3.57	
Missing	4	12.50	
Panel E: Distribution of Staff by Position		Staff of the Pharmacy Council (N=23)	
	n	%	
Accountant	4	17.39	
Inspecting Pharmacist	2	8.70	
Manager	11	47.83	
Pharmacy Intern	1	4.35	
Procurement Officer	1	4.35	
Secretary	4	17.39	

Table 1 shows the socio-demographic characteristics of the Pharmacy Council staff interviewed. Panel A shows the sex distribution of the respondents. Panel B shows the age distribution of respondents in years. Panel C shows their distribution by the region they work. Panel D shows their distribution by the department the work for. Panel E shows their distribution by staff role/position. The last row in each panel represents the missing values for that observation. The first column in each panel shows the socio-demographic variables observed. The figures in the columns labeled 'n' for each panel show the observations for each response. The figures in the columns labeled '%' for each panel show the proportions of each observation in percentage. The total number of respondents (X) for each study area is reported as (N=X) at the header rows for each panel.

Other staffs holding different positions are mostly from the head office. Responses were received from one hundred and thirty-six (136) pharmacy operators. In this section, summary statistics on the socio-demographic characteristics of respondents from the pharmacy operators are presented in Table 2. The summary statistics show the distribution of the respondents by sex, age grouping, educational level and ownership status. Also presented are the percentage proportions for the distributions, relative to the total number of respondents.

Table 2: Socio-Demographic Characteristics of Pharmacy Operators

Panel A: Sex Distribution		Pharmacy Operators (N=136)	
	n	%	
Male	108	79.41	
Female	27	19.85	
Missing	1	0.74	
Panel B: Age Group		Pharmacy Operators (N=136)	
	n	%	
20-29	21	15.44	
30-39	41	30.15	
40-49	40	29.41	
50-59	21	15.44	
60 and above	12	8.82	
Missing	1	0.74	
Panel C: Education Level		Pharmacy Operators (N=136)	
	n	%	
Sec/Voc	22	16.18	
Tertiary	113	83.09	
Missing	1	0.74	
Panel D: Ownership Status		Pharmacy Operators (N=136)	
	n	%	
Owner	53	38.97	
Manager	46	33.82	
Other	36	26.48	
Missing	1	0.74	

Table 2 shows the socio-demographic characteristics of the pharmacy operators interviewed in this study. Panel A shows the sex distribution of the respondents. Panel B shows the age distribution of respondents in years. Panel C shows the highest level of education attained by respondents at the time of interview. Panel D shows the ownership status of the respondents in relation to the pharmacy they operate. The last row in each panel represents the missing values for that observation. The figures in the columns labeled 'n' for each panel show the observations for each response. The figures in the columns labeled '%' for each panel show the proportions of each observation in percentage. The total number of respondents (X) for each study area is reported as (N=X) at the header rows for each panel.

In Table 2, results indicate that majority (79.41%) of respondents were males. Statistics from Table 2 suggests that most of the data gathered in this research reflects the opinion of male pharmacy operators. Results further indicate that the age grouping with the highest number of respondents (30.15%) was age range thirty to thirty-nine (30 – 39). Also, most of the pharmacy operators are within the middle aged population group. There is however a significant number of younger aged groups engaged in the operation of pharmacy. In general however, the statistics reflects the normal distribution of labour force in Ghana. With regards to the highest level of education attained, results indicate that all respondents had attained at least secondary/vocational level of education with a very large percentage (83.09%) of them having tertiary education. This pattern was expected due to the nature of work and level of knowledge/expertise required to successfully operate a pharmacy business. Summary statistics on the ownership status of the pharmacy operators indicate that more than half (38.97%) of respondents were owner managers. This could be attributed to the reason that pharmacy businesses in Ghana are operated as small enterprise with direct cash transactions. Owners of such enterprises usually operate the businesses on their own or with family members (Kwabena et al, 2013).

The Information Systems Environment of the Pharmacy Council

In this section, summary statistics on the information systems available at the Pharmacy Council are presented in Table 3. Also presented are the percentage proportions for the distributions, relative to the total number of respondents.

Table 3: Summary Statistics on Pharmacy Council Regional Offices with Websites and Departments That Have Email Addresses and/or Computers

Region	Has Website	Departments with Email Addresses	Departments That Have Computers
Eastern	Yes	Accounts	Inspectorate, Accounts
Ashanti	Yes	Inspectorate, Accounts	Inspectorate
Western	Yes	-	Inspectorate
Northern	Yes	-	Inspectorate
Volta	Yes	-	Inspectorate
Greater Accra	Yes	MIS & P, Accounts	Inspectorate, PPME, MIS & P, R & L, Accounts, ETD

Table 3 shows the summary statistics on Pharmacy Council regional offices and departments that have computers, websites and/or email addresses. From the left, the first column of Table 3 shows a list of the regions. The second column indicates responses to observations on the availability of a website. Third column indicates departments per region that have email addresses. The fourth column indicates, per region, departments that have working computers.

Results in Table 3 indicate that not all regional offices and departments had email addresses. Results in Table 3 further indicate that all departments at the Greater Accra region have at least one computer. Results also indicate that the inspectorate department in each regional office has at least one computer. These results suggest that each regional office has at least one computer for staffs to work with; however some of the departments do not have email addresses they could use. This further suggests that some level of computerization already exists at each regional office of the Pharmacy Council.

Responses were also received on the knowledge and/or experience of staff in the use of computers. Summary statistics on the responses is presented in Table 4. Results on computer knowledge are in three categories; high – to indicate advanced knowledge, average – to indicate basic knowledge, never – to indicate staff who have never had any experience with the use of computers. Responses were further solicited from staff on access to use a computer at the departments they worked. Summary statistics on their access to use computers at their departments are presented in Table 4.

Table 4: Summary Statistics on Distribution of Staff by Computer Knowledge

Panel A: Computer Knowledge		N	%
High		22	68.75
Average		9	28.13
Never		0	0.00
Missing		1	3.13
Panel B: Require Computers for Work		N	%
Yes		24	75.00
No		7	21.87
Missing		1	3.13
Panel C: Use A Computer at Work		N	%
Yes		27	84.38
No		4	12.50
Missing		1	3.13

Table 4 shows summary statistics on Pharmacy Council staff based on their knowledge and access to use computers at work. Panel A shows the distribution of respondents based on their knowledge about computers. Panel B shows the distribution of respondents who require computers to work. Panel C shows the distribution of staffs that have access to use a computer at work. The last row in each panel represents the missing values for that observation. The figures in the columns labeled 'n' for each panel show the observations for each response. The figures in the columns labeled '%' for each panel show the proportions of each observation in percentage.

Results from Table 4 indicate that at almost all respondents had some experience with the use of computers with more than two-thirds (68.75%) of the respondents having a high level of experience with the use of computers. These results suggest that majority of Pharmacy Council staff have high level of knowledge in operating computers. At least, every member of staff interviewed has knowledge in the use of a computer. This further suggests that the Pharmacy Council’s human resource is well equipped for a computerization program at the Pharmacy Council with little training. As indicated in Table 4, over eighty per cent of respondents have access to use computers at their departments. Interestingly, 4 respondents indicated that

they don't have access to use computers at their departments. Results from responses about access to a computer suggest that, most of the Pharmacy Council staff (84.38%) were exposed to using computers. The few (12.5%) who indicated that they did not have access to computers attributed that problem to the limited number of computers available at the region. Following analysis on computer knowledge, results on the experience of pharmacy operators on information systems are presented in Table 5. Statistics on level of knowledge in computers and operators who have their pharmacies computerized are presented. Also presented are the percentage proportions for the distributions, relative to the total number of respondents.

Table 5: Summary Statistics on Computer Usage Experience

Panel A: Computer Experience		
	N	%
High	90	66.18
Average	38	27.94
None	6	4.42
Missing	2	1.47
Panel B: Computerized Pharmacy		
	N	%
Yes	76	55.88
No	56	41.18
Missing	4	2.94

Table 5 shows summary statistics on pharmacy operators based on their experience with the use of computers. Panel A shows the distribution of operators based on their level experience with computers. Panel B shows the distribution of operators with computerized pharmacies. The last row in each panel represents the missing values for that observation. The figures in the columns labeled 'n' for each panel show the observations for each response. The figures in the columns labeled '%' for each panel show the proportions of each observation in percentage.

Results in Table 5 indicate a high number of advanced users of computers. Six (6) respondents indicated that they have no experience using a computer. These results suggest that the Pharmacy Council may have a number of clients who may not have the ability to use computers. Although results in Table 5 indicate that almost fifty per cent of pharmacy operators interviewed have not computerized any of their business operations, the relatively large number of pharmacy operators who have computerized pharmacies supports the recognition of the value of computerization to the operation of businesses. This finding also suggests a potential environment for a seamless integration between the Pharmacy Council and pharmacy operators. An effort to computerize the Pharmacy Council may increase the number of pharmacy operators that may decide to computerize their pharmacies.

Perceptions about Computerization of Processes/Services of the Pharmacy Council

Responses were received concerning the extent to which Pharmacy Council staffs agree with the computerization of certain operations of the Pharmacy Council. Summary statistics of the responses is presented in Table 6. Results from the statistics indicate a high number of respondents agreeing with computerization of the listed operations of the Pharmacy Council. The relatively high strong approval from the staff respondents to computerize the renewal of license may be attributed to the fact that this activity is the most commonly recurring among the others. The few responses that disagreed to computerization of some of the services suggest that some staff have not yet adjusted to the use computers in their duties. With regards to opinions from pharmacy operators about the computerization of certain operations of the Pharmacy Council, summary statistics presented in Table 6 indicate that a high number of respondents agree with computerization of the listed operations of the Pharmacy Council. A relatively low proportion of pharmacy operators however do not strongly agree with the computerization of enquiry services.

Table 6: Summary Statistics on Staff Opinion about the Computerization of Listed Processes/Services

Panel A: Opinions from Pharmacy Council Staff							
	SA	A	I	D	SD	Missing	Total
Application for Relocation	22 68.75	6 18.75	2 6.25	1 3.13	0 0.00	1 3.13	32 100.00
Application for a New License	21 65.63	6 18.75	1 3.13	2 6.25	1 3.13	1 3.13	32 100.00
Renew License	27 84.38	3 9.38	1 3.13	0 0.00	0 0.00	1 3.13	32 100.00
Enquiries	17 53.13	8 25.00	3 9.38	2 6.25	0 0.00	2 6.25	32 100.00
Registration	24 75.00	4 12.50	0 0.00	1 3.13	0 0.00	3 9.38	32 100.00
Panel B: Opinions from Pharmacy Operators							
	SA	A	I	D	SD	Missing	Total
Application for Relocation	71 52.21	50 36.76	7 5.15	2 1.47	0 0.00	6 4.41	136 100.00
Application a New License	81 59.56	36 26.47	7 5.17	3 2.21	0 0.00	9 6.62	136 100.00
Renewal of License	99 72.79	30 22.06	2 1.47	1 0.74	0 0.00	4 2.94	136 100.00
Enquiries	88 64.71	37 27.21	3 2.21	1 0.74	0 0.00	7 5.15	136 100.00
Registration	97 71.32	30 22.06	1 0.74	2 1.47	0 0.00	6 4.41	136 100.00

Table 6 shows summary statistics on the opinions of both Pharmacy Council staff and pharmacy operators about the computerization of a list of services at the Pharmacy Council. Panel A shows opinions from Pharmacy Council staff. Panel B shows opinions from pharmacy operators. The figures in the columns labeled 'SA' for each panel show the observations that strongly agree to service computerization. The figures in the columns labeled 'A' for each panel show the observations that partially agree to service computerization. The figures in the columns labeled 'I' for each panel show the observations that are indifferent to service computerization. The figures in the columns labeled 'D' for each panel show the observations that partially disagree to service computerization. The figures in the columns labeled 'SD' for each panel show the observations that strongly disagree to service computerization. The column labeled 'Missing' in each panel represents the missing values for the observations

Similar to responses from staff respondents, results from Table 6 suggests that pharmacy operators also strongly allude to the computerization of renewal of license for possibly the same reason that it is the most commonly recurring process. Following results on perceptions, responses from pharmacy operators on the computerization and service quality improvement at the Pharmacy Council were paired with their ages to determine the association between the age of the respondent and response on whether computerization can improve the quality of service at the Pharmacy Council. The strength of the association was also subjected to a chi-square test. Univariate logistic regression models on the on perception about the effects of computerization on the service quality of the Pharmacy Council against operators' age and computer usage experience is presented in Table 7.

Table 7: Univariate Logistic Regression Model on the Influence of Age on Clients’ Perception about the Effects of Computerization on the Service Quality of the Pharmacy Council

Panel A: Age Groupings	Odds Ratio	P-Value
20-29	1	
30-39	0.63**	0.70**
40-49	1.95**	0.64**
50-59	0.30**	0.32**
60 and above	0.13**	0.10**

Panel B: Experience with the Use of Computers	Odds Ratio	P-Value
High	1	
Average	0.83**	0.8**
None	0.11**	0.03**

Panel C: Has Computerized Pharmacy	Odds Ratio	P-Value
Yes	1	
No	0.89**	0.9**

*This table shows logit models that use Odds Ratio and the Pearson’s Chi-square test to determine the significance of association for the observations among pharmacy operators in this study. Panel A shows the logit model for age grouping. Panel B shows the logit model for experience in using computers. Panel C shows the logit models for operators that have computerized pharmacies. The first column in each panel in Table 7 shows the variables for the observations that are tested. The figures in the second column of each panel are the Odds Ratios. The third column in each panel shows the P-value. The symbols ***, ** and * indicate significance at 1, 5 and 10 percent levels respectively. The symbol '<0.001' indicates that the actual P-value is less than 0.001.*

Following the Odds Ratio, for each operator within the 20-29 age grouping that approved computerization as a quality improvement approach for the Pharmacy Council, there is likely to be 1.95 more operators within the 40-49 age grouping that would approve computerization but 0.13 more operators aged 60 and above who would approve computerization. None of the p-values for each age grouping however is below 0.05. Results of the p-values from the regression model in Table 7 suggest no significant relation between age of pharmacy operators and their opinions about whether computerization can improve service quality at the Pharmacy Council. Results in Table 7 however indicate a significant association between those who had never used a computer before and their response on whether computerization can improve service quality at the Pharmacy Council. This relation may explain why some of the pharmacy operators disagree to the computerization of the processes/services of the Pharmacy Council. Also, there is a significant level of association between pharmacy operators who have computerized pharmacies and the perception of the pharmacy operators about whether computerization can improve the quality of service of the Pharmacy Council. Results from Table 7 suggest that pharmacy operators that have integrated computers with their business tend to appreciate the value of computerization better than those who have not computerized their businesses.

Concerns in Computerizing the Services/Processes at the Pharmacy Council

Responses were solicited on issues that may pose challenges to computerizing services or processes at the Pharmacy Council were received. These challenges were responses from Pharmacy Council staff. Results indicated that the availability of computers and expertise to maintain the system were the major concerns of the staff. The lack of commitment from top management to computerize services was also indicated as a challenge. Furthermore, some staff explained that computerization was not top priority on budget and management plans. Other staff attributed this lack of top-level commitment to the low level of knowledge among top management in using computers. Other staff also attributed the lack of top-level commitment to the centralized nature of processes at the Pharmacy Council. On the part of top management, the cost of equipment and employing new personnel to manage and maintain the system were the major issues raised. Challenges indicated by top management included the perceived high cost and lengthy process of training staffs. Other managers also mentioned the perceived difficulty in computerizing certain services and decision processes require physical presence and discretionary decisions.

CONCLUDING COMMENTS

To conclude, the general objective of the study was to assess the role of information systems in enhancing the performance of the Pharmacy Council in its activities. The study was conducted at the Pharmacy Council, in addition to one hundred and thirty-six (136) Pharmacies in the Ashanti Region. The demographic and business characteristics of the pharmacy operators studied were determined and information was tapped from responses from both Pharmacy Council staff and pharmacy operators to achieve specific objectives set out for the study. A very large percentage of pharmacy operators had obtained tertiary education. This pattern was expected due to the nature of work and level of knowledge/expertise required to successfully operate a pharmacy business. Results from the statistics indicate that a high number of both the staff and pharmacy operators strongly agreed with computerization of the listed operations of the Pharmacy Council. There were relatively high approval from both the staff and pharmacy operators to computerize services for license renewal; the most commonly recurring service compared with the others. From this indication, an information system presents a great potential for the Pharmacy Council to reengineer its processes to meet the current global trends and improve on its service delivery. There is no significant association between the age of the pharmacy operators and their perception of the value of computerization to improve the quality of service of the Pharmacy Council. However, responses from pharmacy operators that have experience with the use of computers and those that have computerized pharmacy have significant associations with their perceptions about whether computerization can improve the quality of services of the Pharmacy Council.

Based on the findings that there is a high level of computer literacy among the staff of the Pharmacy Council, it is recommended that more effort on computerization of the service of the Pharmacy Council should be concentrated on providing adequate equipment. The Pharmacy Council may have to consider increasing the number of computers available for use per region/department in order to ensure effective implementation of a computerized system. The complete access to computers at certain regions should be maintained. However, other regions with limited staff access to computers should be furnished with enough computers to cover, at least all staffs that require computer access in order to carry out their duties effectively. Since the existing human resource available at the Pharmacy Council have knowledge in the use of computers, the Council may require very little training for the staff. Concerning pharmacy operators, any effort to computerize the Pharmacy Council may have to take into account strategies that would not make the computerization exercise a disadvantage to the minority of operators that have no knowledge about using computers in order to ensure that computerization provides improved service delivery. Training programmes prior to and during computerization of the Pharmacy Council could be held to expose these pharmacy operators to the use of computers. On the other hand, packages such as end-to-end service integration with pharmacy operators who have their businesses already computerized may encourage more pharmacy operators to computerize their pharmacy businesses and hence provide more support to ensure that computerization enhances the service quality of the Pharmacy Council.

Considering the high number of staff and pharmacy operators in favour of computerizing the renewal of license, the Pharmacy Council should consciously examine all other frequently recurring services and formulate strategies to computerize them. The identified association between experience of use and perception of the value of computerization suggests that, any effort toward computerization at the Pharmacy Council may be more effective if it is preceded by an awareness program; a program that should introduce pharmacy operators who have no experience in the use of computers to the benefits of computerizing systems. Based on the findings that the lack of personnel with high expertise coupled with the cost of hiring new personnel to manage an information system are significant challenges to computerization, the Pharmacy Council may consider alternative options of outsourcing the development and maintenance. On another hand, a little upgrade of the skills of a few of the existing staff with highly advance skills in using computers may prove cost effective. Following the challenges of commitment by top managers, it is recommended that one service process in one regional office should be computerized as a prototype. After

a period, the experience from the prototype should be evaluated against those of other processes. This may serve as an evidence base to strengthen the commitment of top management to computerization. Concerning the difficulty in computerizing certain services, it is recommended that computerization should commence with the processes that could be easily computerized and gradually research into how other complex process could be also computerized. Further studies into the information systems of the Pharmacy Council should examine the availability and effectiveness of the administrative structures and Information Technology policy documents. Finally, data collection was skewed towards male operators of pharmacies. Further studies should endeavour to solicit views from an equal number of male and female operators for a richer response. From a technical perspective, further studies should examine should take into account recovery rate in case of system failure.

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