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A Monitoring and Control System for Micro and Small Enterprises: The Use of RUMSEG at the District Level in Ghana

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Abstract
Rural folks in many districts in Ghana engage in various profit-making businesses which range from traditionally skilled-based manufacturing to retailing businesses. As a result, local government authorities together with stakeholders such as Rural Enterprise Project (REP) are interested in monitoring the development tendencies of these trade categories at their micro and small-scale levels. This paper comes out with Rural Micro and Small Scale Enterprises Growth (RUMSEG) tool that enables District Assemblies (DAs) to monitor and evaluate growth performances of Micro and Small-scale Enterprises (MSEs) at the district level, and serve as an aid to revenue mobilization. Beta testing and the agile iterative method were employed during modules testing and with a backend relational database to store client's information. RUMSEG was tested at the Business Advisory Centres (BACs) of Asuogyaman and Atwima Nwabeagya District Assemblies in Ghana. Aided by the Enterprise Monitoring Diary (EMD), RUMSEG produced differences in clients' growth performances in the context of turning actual cost of training by stakeholders into actual outputs of skills, abilities and competencies.
Keywords: growth performances, trade categories, stakeholders, RUMSEG, District Assemblies (DAs)

1. Introduction

Rural enterprises are all forms of income-making engagements by rural settlers that promote self-employment, skills development, improve rural livelihood and contribute to local economic growth and development. Unlike urbanized enterprises, Lennie *et al.* (2005) stressed that rural poor and entrepreneurs mostly lack the needed technology transfer to harness their potentials, skills and talents to progressively develop along the growth continuum. It is for this reason that local government activities aim at promoting rural enterprises through projects and programmes with information technology interventions as one of the key success factors. With similar motive, stakeholders and development agencies take up responsibilities to contribute to community development projects including rural entrepreneurial initiatives and development. Ahenkan *et al.* (2013) explained that stakeholders and local communities are marginalized in the local governance processes in times of decision making on community projects and programmes. Impliedly, the local government system is thus expected to effectively partner stakeholders in bringing development to the districts. Though the local government structure is to discern development in a bottom-up fashion, much according to Boyne (1992) is required of the district authorities to promote better service co-ordination, clearer accountability, greater efficiency and streamlining decision making processes. Interestingly, they serve as the point of contact between government and the citizens (Cox *et al.*, 2010). Obviously, authorities of the local government system cannot single-handedly sustain development without the support of development partners. This supports the claim by Lachapelle and Shanahan (2010) that development is more of an inter-disciplinary than being only multi-faceted. It must be emphasized that development partners and agencies in the context of community development are seen as new units of the overall local government structure necessary to reduce the management and development costs at the local level while ensuring better service delivery.

For many middle income countries like Ghana, there is a clear divide between urban and rural areas, and this is usually based on what characterizes each of these. Such characteristics range from ethno-cultural settings to socio-economic factors. Indeed, several attempts are made by governments in the sub region of sub-Sahara Africa to improve living standards and promote socio-economic growth especially in the rural areas.

Trade liberalization continues to impact rural-urban linkages (Tacoli, 2003), and this effect is also significant in Ghana with a new conception that businesses can also thrive well in the rural areas including peri-urban areas. Small-scale enterprises located in many remote districts are challenged with not only traditional or limited technology but also access to credit facilities for business expansion and development. Today, the severity of rural-urban drift is partially curtailed by such engagements of the youth in micro and small scale enterprises (Mitlin and Satterthwaite, 2012). This is an indication of importing urbanized small-scale enterprises to the rural areas. Such brisk non-farm businesses are possible growth signs towards urbanization (Haggblade *et al.*, 2010). However, non-farm rural entrepreneurs fail to attain growth if not supported by good economic policies from the auspices of local government authorities and development agencies. It is imperative for a local government system or a rural development agency to include in its development framework or polices an electronic based system that monitors and evaluates the growth of non-farm business activities. Thus, local

government authorities can analyze information resources of rural small-scale enterprises, store, annotate, share and access them for quality service delivery, and for the purposes of revenue mobilization.

Computer-based monitoring and evaluation systems permeate every aspect of business management and performance including non-farm rural enterprises at micro and small-scale levels. As pointed out by Chamberlain *et al.* (2012), significant innovations and rich technological content are key contributors to rural empowerment, and a lead edge for rural industrialization. In Ghana, for example, authorities of the district assemblies fail to recognize rural micro-scale enterprises as agents for technology development, and hence the need for an information management system to handle the information needs of these enterprises (*Antwi et al.*, 2013). Thus, this paper develops Rural Micro and Small Scale Enterprises Growth (RUMSEG) tool to capture data on clients on a WEB based platform and to monitor and evaluate their growth performances while allowing shared platform to include other decentralized departments.

It must be however stressed that the RUMSEG tool is integrated with Geographic Information System (GIS) to aid locating these enterprises and revenue mobilization, and the use of Enterprise Monitoring Diary for recording scores on performance indicators. In addition, the RUMSEG tool provides baseline rural MSE information to assist policy makers not only in their strategic decisions but also determining the development trend in rural non-farm business activities. It is therefore obvious that RUMSEG and other similar applications impacts rural empowerment and rural non-farm employment (Tzikopoulos *et al.*, 2012). Further, there are a number of stakeholders involved in championing sustainable rural enterprise development in districts in Ghana. Though these stakeholders have their respective objectives to contribute to a common goal, there is still the need to have Management Information System (MIS) that connects rural enterprise development stakeholders together in terms of resource, cost and information sharing to promote rural job creation and entrepreneurial development. Such a technology in fusion strengthens collaborations and enhances decision making for quality business development service delivery at the local level.

This paper introduced stakeholders-local government interactive model, and this was used to develop the RUMSEG application tool. To exemplify the implementation of the model, the study focused on five main trade categories of the Asuogyaman District Assembly. Critical reports and other relevant information on trade performance indicators can be accessed by all stakeholders involved in rural enterprise businesses.

2. Mediating Role of MIS in Rural Enterprise Development

The approach to rural enterprise development in Ghana has attracted a lot of development partners and collaborators over the years even outside the scope of the District Assemblies' responsibilities and jurisdiction. By virtue of the decentralization policy, power is transferred to governance structures to enable the indigenous people fully participate in decisions that affect their livelihood and development. Though decentralization in Ghana is challenged with limited attention given to sub-district levels, efforts are still made to promote rural non-farm activities in order to reduce or alleviate poverty among rural folks. Complementing these attempts, management information systems have become pivotal in organizing and managing information regarding rural enterprise activities.

2.1. MIS as a Critical Success Factor

As the District Assemblies are mandated through the Local Government Act No. 462 of 1993 to carry out development projects and programmes based on government policies, other stakeholders execute development projects on different dimensions of the rural settings. As a result, there are multiple NGOs, Agencies, Groups and individuals that offer various forms of support to the rural communities (Badu and Parker, 1992). A classical case is the Rural Enterprises Projects (I and II) which this paper considered. Thus, information regarding the operations of these stakeholders and the local government administration must be coordinated in a way that makes it accessible to all parties involved similar or opposing enterprise projects. This must include clients or beneficiaries targeted for various micro or small- and medium-scale entrepreneurial training, job creation and development. One common way to do this is to have a management information system platform hosted at the local government administration that makes available information and/or data about all stakeholders involved in the provision of rural enterprise services.

MIS is a computer-based system developed to capture data and provide tools necessary to organize, evaluate, analyze circumstantial information to aid decisions about some parameters of interest at any point in time. According to Laudon and Laudon (2012), the diversified nature of functions of an institution determines the degree of integration of people (direct and indirect users), software applications, database systems, hardware resources, network resources and decision support systems. Applegate *et al.* (2007) reiterated that information and knowledge management must be recognized as essential aspects of every enterprise activity, and this notion does not exclude rural enterprises. Moreover, for sustainable rural enterprise development, MIS goes beyond mere access to information to include the associated knowledge that Lead Service Providers (LSP) can depend upon to support rural entrepreneurs (Berdegue *et al.*, 2000). Today, MIS has become a critical factor in the

design and implementation of rural enterprise projects, but its recognition at the local governance level to effectively monitor and measure performance of rural business enterprises in Ghana is rather championed by business development stakeholders such as Rural Enterprise Projects (REP). A reverse of this phenomenon by local government authorities is required such that local entrepreneurs are empowered to participate in the selection of performance criteria, and indicators supported by a functional MIS – RUMSEG. Indeed, such an integrated system can be extended as an online system to reach all parties interested in rural enterprise growth and development. In this way, Håkansson (2015) emphasized the relevance of separate and reliable portals for information sharing. This facility exposes rural entrepreneurs to e-commerce benefits (Bocij *et al.*, 2008), and this promotes the development of business partnerships for increased efficiency and competitiveness. Thus, rural micro- and small-scale enterprises gradually gain international recognition in the production of traditional or domestic products and services (Pandit, 2011). It must be emphasized however that the design and implementation of RUMSEG at the Asuogyaman District Assembly drawn closer clients, district assembly authorities and officers of REP.

2.2 RUMSEG Knowledge Management Model

The baseline design of RUMSEG considered REP activities in five trade categories namely Traditional craft, Agriculture and Forest Product, Services, Agro-processing, Primary fabrication and Repairs of the Asuogyaman District. The District Assembly through the Business Advisory Centre and National Board for Small Scale Industries (NBSSI) are to team up with stakeholders in the district to identify and set objectives to promote rural entrepreneurial development. Data regarding trade activities become available to the District Assembly for analysis, and this becomes easy for the authorities of the District Assembly to make decisions. For instance, REP I and II had significantly contributed to rural entrepreneurial development in Ghana and the Asuogyaman District had benefited from their initiatives including start-up capital, training, business idea development, creativity, innovations, financial assessment of businesses, technology adaptation, market analysis and business security.

In the provision of Business Development Services (BDS), the authorities of the District Assembly can best assess various categories of trade and determine those that perform better in terms of growth. This provides a basis of inclusion in strategic plans of the assembly and the best ways to develop both fast and slow growing businesses in the district. It is however true that government over the past years had tried to intensify efforts towards '*domestication*' – a concept that attempts to make Ghanaians patronize goods produced domestically. Through the use of RUMSEG, the authorities of the District Assembly can identify weaker trade zones and provide the needed interventions for growth. Such interventions can further be assessed for significant impacts on trade performances, and this can serve as a feedback for decision making and hence improved trade performance of clients.

For the purpose of this study, the operative role of REP in rural enterprise development especially in the Asuogyaman District was considered as the basis of the model. This simplified model (**Figure 1.**) ensures that knowledge generated within projects of REP are systematically identified, analyzed, documented and shared among all stakeholders involved in business delivery services to local entrepreneurs of the district.

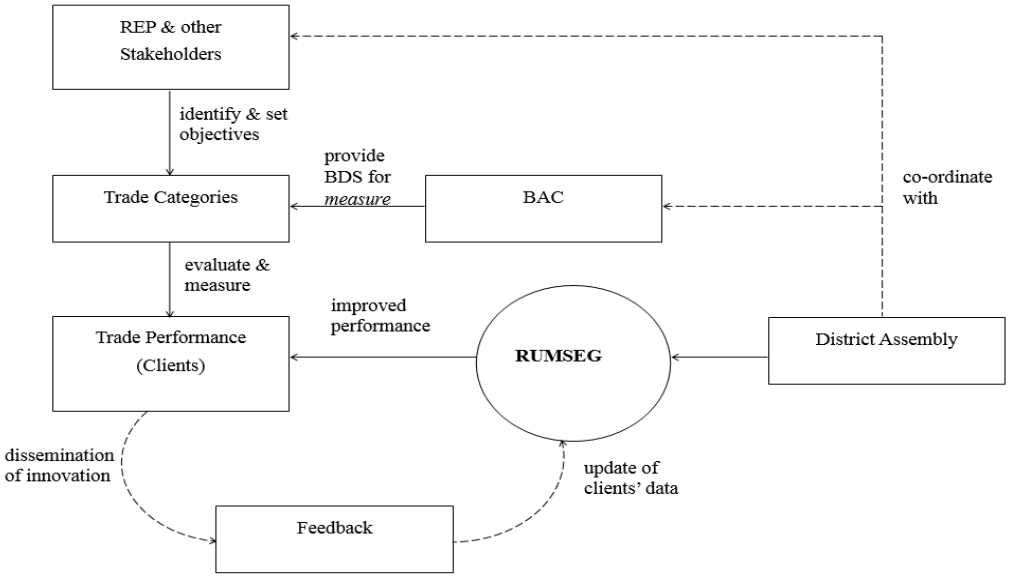

Figure 1: Simplified knowledge management model for RUMSEG

It must be however emphasized that RUMSEG does not only provide information to support decisions

of the District Assembly but also to help improve project performance and delivery of project objectives of REP and other stakeholders. Moreover, important business-related issues can be earlier identified and conveyed to policy makers at the local government level for sustainable market at the local level. This offers antidote to strengthening business-to-business linkages among rural entrepreneurs (African Development Bank Group, 2012). With RUMSEG and effective monitoring of performance indicators on trade categories of clients, sufficient information becomes available for local planning. Thus, different models and technology adaptation for sustainable rural enterprises can be introduced to promote economic sustainability, capacity building, innovation and creativity at the local level.

2.3 Trade Categories and Rep in Context

REP aims at reducing poverty at the local level through interventions such as skills transfer and technology development, creation of sustainable jobs, access to credit facilities, attractiveness and competitiveness of rural businesses and increasing income levels of project beneficiaries for improved standard of living. The study considered active project beneficiaries that REP offered various interventions and performance indicators monitored and assessed in the Asuogyaman District.

2.4 Monitoring of Trade Categories

Businesses in the areas of the five trade categories identified as traditional craft, agriculture and forest product, services, agro-processing, primary fabrication and repairs were seen to be either start-up businesses or sustained businesses with meager income generation. The number of active clients beneficiaries involved in these non-farm activities is shown in **Table 1**.

Table 1: Trade categories in the Asuogyaman District

Trade Type	**Active Clients**	**Percentage (%)**
Agro - processing	50	23.9
Services	91	43.5
Primary Fabrication and Repairs	41	19.6
Traditional Craft	4	1.9
Agric. and Forest Products	23	11.0
Total	**209**	**100**

Further, some agro-processing businesses included oil palm production, soap making, cassava for 'gari' production and maize for dough making while welding and fabrication of farm implements and agro-based equipment, carpentry, vulcanizing, electronic and electrical works and auto spraying and machining were some businesses of the fabrication and repairs category. Also, traditional craft activities included basket weaving, textile weaving, batik tie and dye production and leather works. Service enterprises included traditional catering, hairdressing and dressmaking. It is expected that businesses in these categories progressively grow according to the number and content of interventions given to clients in respect of increasing revenues. A significant growth however depends on effective monitoring team and strategies put in place. Thus, data on performance indicators through effective monitoring become feedback data for analysis using RUMSEG.

The study observed a top-down client monitoring structure that marginalized participation of clients in the overall monitoring process. The structure of the client monitoring team (as shown in **Figure 2**) exhibits a top-down approach to monitoring activities of clients in the district. The use of RUMSEG eliminates this system of monitoring to one that makes information available to all participating members in promoting rural entrepreneurial development. For instance, Local Business Associations (LBAs) can as well have information about their members, and together with other stakeholders improve performance of clients. Thus, growth performance data through monitoring activities are easily captured and analyzed using RUMSEG, and decisions made about project clients.

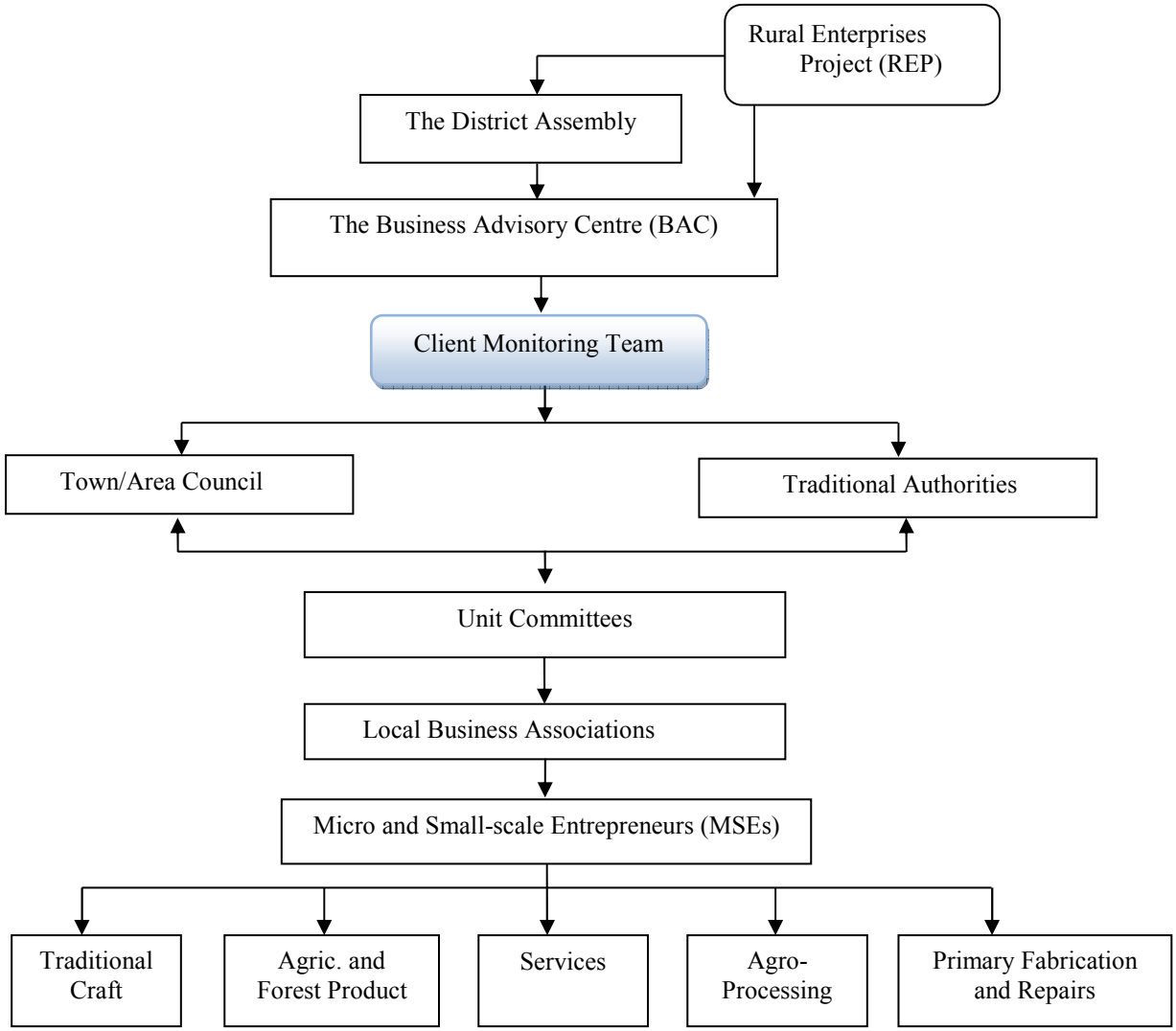

Figure 2: Structure of client monitoring team

3. Methods and System Design

The study focused on active project beneficiaries in the five trade categories with each trade type further categorized as start-up, normal growth and survival growth. 13 communities were purposively selected because they had received project interventions from REP, and also 209 active businesses were obtained from the BAC clients' database. Questionnaires were used to obtain relevant growth performance data and clients' business information for the creation of the relational database. A section of clients' data and performance indicators of the database is shown in **Figure 3**.

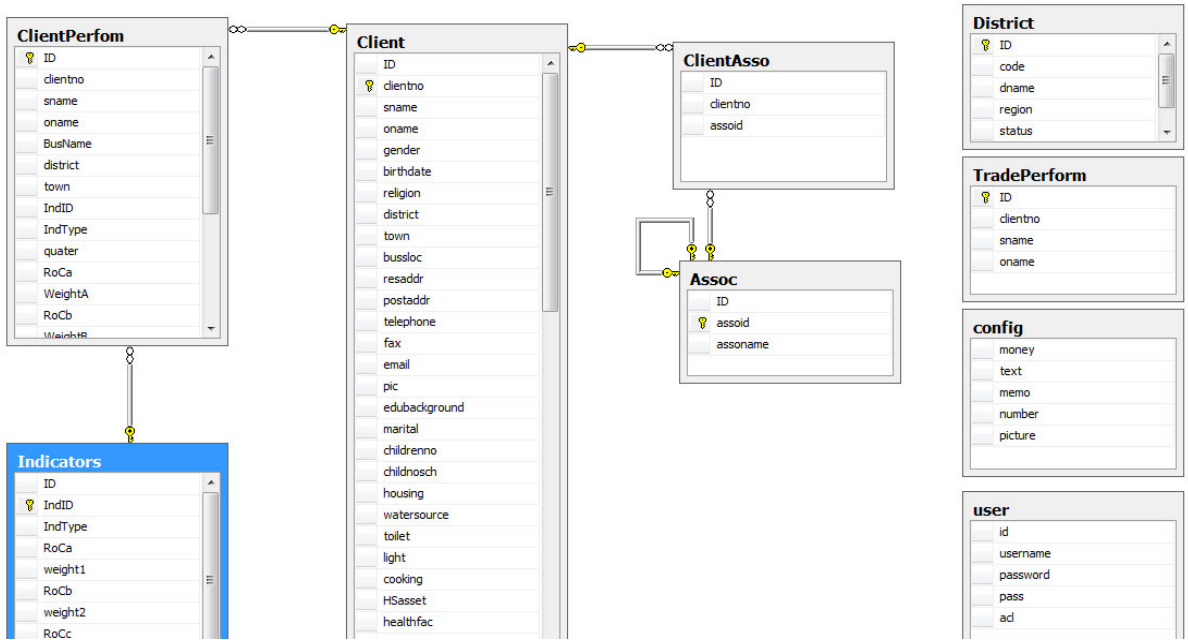

Figure 3: Clients' data and performance E-R diagram

As regards the application design, RUMSEG was modeled in consonance with the System Development Life Cycle (SDLC) architectural framework. The traditional model was used because of the stage-wise nature of project interventions and reviews of clients' growth performance monitored and evaluated by REP and sometimes BAC. However, the agile approach was employed during the modules testing. RUMSEG has four main elements namely; the *process* for turning inputs such as skills training to outputs such as income-based employment, the *monitoring mechanism* for gathering information about outputs from the process such as information about the number of project beneficiaries trained and the extent of their new skills in the training activity, the *comparison mechanism* that compares current performance information with previous ones such as comparing actual skills gained by clients with expected outcomes, and the *control mechanism* that ensures implementation of corrective actions based on the outcomes of the comparison. An example is making changes to an outcome indicator target as a result of skill levels obtainable through training being lower than expected. It must be noted that these four elements depicts a feedback loop (**Figure 4**).

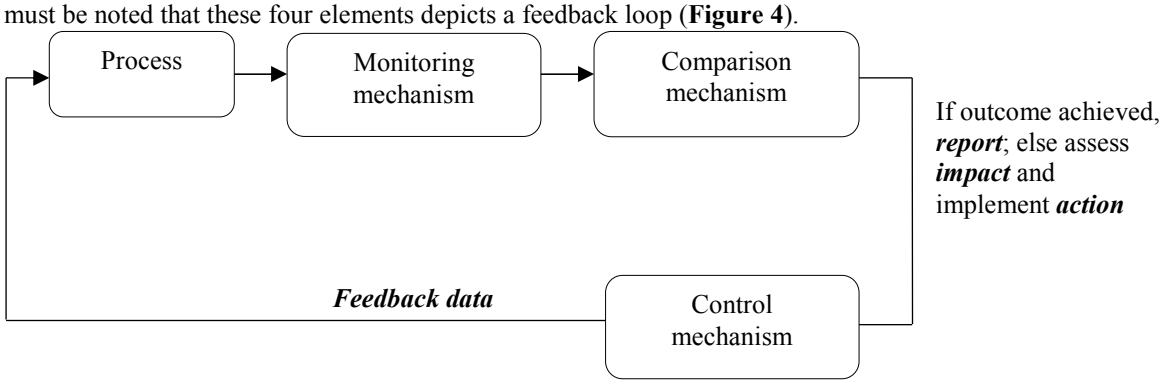

Figure 4: Elements of RUMSEG in a feedback loop

However, the general architecture of the system was based on the four elements and this necessitated the development of user roles including system analysis and specification using Unified Markup Language (UML). The Visual Basic.Net studio was used to simplify user interfaces as well as establishing linkages to databases and other applications. Unit testing was done simultaneously with coding of the module so that different parts of the module code could be executed and to detect coding errors if any. Further, beta test was done at the BAC, and this was a live application which end users used and reported problems identified. As a result, final modifications were done to ascertain the reliability of RUMSEG. In a full blown scale, RUMSEG was tested at the BACs of Atwima Nwabeagya District Assembly in the Ashanti region and the Asuogyaman District Assembly of the Eastern Region. RUMSEG adopted the Graduated Colour Evaluation (GRACE) tool for data input because according to Antwi *et al.* (2013) it is one useful tool that accumulates and aggregates information on performance of project clients. With regard to using RUMSEG, user manual and training manual were included in the documentation.

In addition, GIS was included in RUMSEG architectural framework to facilitate the monitoring

activities of project clients. For example, it used the GIS component to present detailed information about a soap maker who was a project client at Gyakiti, a community about 60 kilometers from the district capital. A snapshot is shown in **Figure 5** with Gyakiti marked on the map.

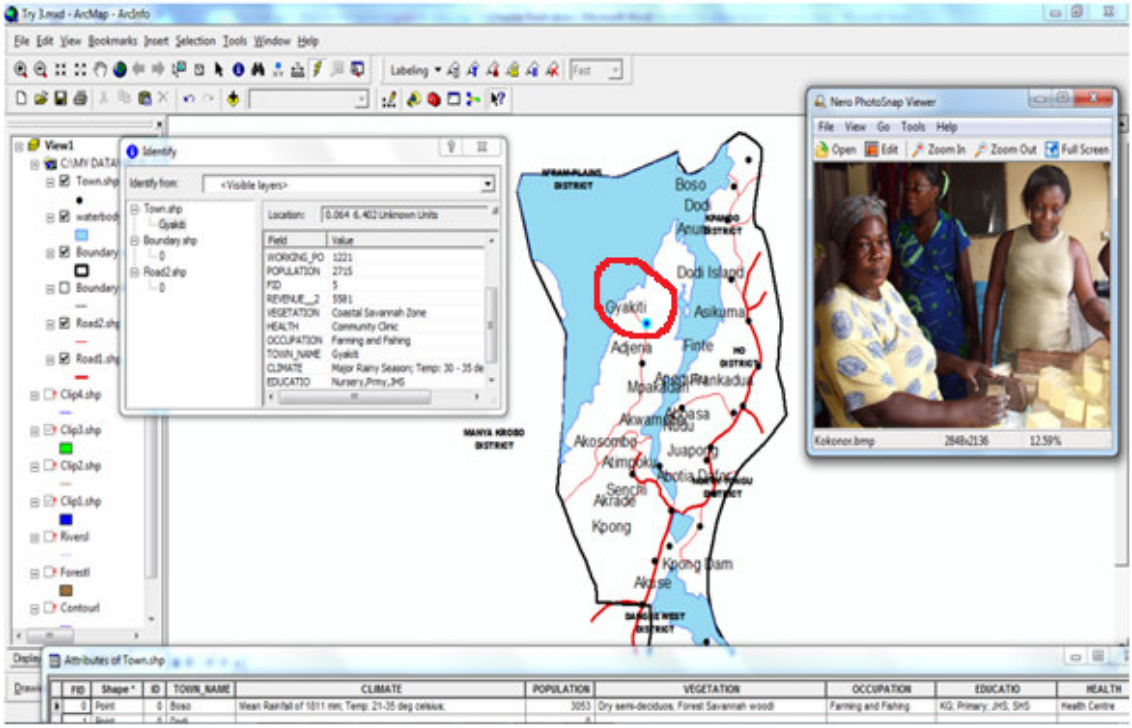

Figure 5: Identification of a soap maker using GIS component

Moreover, the input data for the GRACE tool complements RUMSEG security checks in respect of protecting clients' information. Thus, clients' performance indicators become well nurtured in the database for real time analysis. Also, Enterprise Monitoring Diary captures data on clients' performance results, and these are aggregated using the GRACE tool. Performances of clients are automatically generated after the indicator performance scores are entered and measured against baseline score. It must be pointed out that it is at this stage that business service providers can make better decisions on the kind of interventions and technology to introduce for subsequent periods.

4. Conclusion and Recommendations

District Assemblies in Ghana lacked information resources including SMEs electronic-based monitoring systems to constantly assess business service providers' interventions and technology transfer on rural non-farm activities. The study revealed that only 17% represented information kept electronically about rural enterprises as against 58% manually. This is an indication that MIS was not adequately used by the Assembly to aid its information flow and decision making processes. The use of RUMSEG removes this deficiency in information management, and support decisions about rural enterprises. Also, as a tool to identifying and determining clients' performance behaviours, it eases revenue mobilization among rural businesses for local economic development. Besides, local socio-economic development is of much priority to the government of Ghana, and as such the continued strengthening of her partnership with other development agencies, there is still the need to further strengthen the Local Business Associations (LBAs) with information on the performance of their members, and also to provide immediate technical back stopping and information sharing that consolidate the expected skills and knowledge obtained by clients in a sustainable manner. Thus, it is imperious on the part of the BAC, project monitoring team and LBAs to harmonize collected growth performance data from project beneficiaries and analyze them using RUMSEG. In this way, the District Assembly can forecast growth trends among various trade categories in the district over a period of time in order to achieve a significant rural enterprise growth.

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