The Journal of Public Affairs and Development
Volume 1, Number 2, July - December 2012, pp. 119– 139
ISSN 2244-3983

Determinants in Sustaining a Local Information System in the Philippines: The Case of the Barangay Management Information System (BMIS)

CHARINA P. MANEJA[1]*, NANCY A. TANDANG[2],
and MERLYNE M. PAUNLAGUI[3]

Abstract: Information is important for the executive and legislative functions of local officials. The study determined the institutional and individual factors that contributed in sustaining a Barangay Management Information System (BMIS). The study was done in five provinces covering 90 randomly selected continuing barangays and 68 randomly selected non-continuing barangays. Chi-square Test of Independence was used to determine factors associated with whether the barangay will continue to sustain BMIS or not. Logistic regression analysis was also performed to determine factors that may influence barangay's decision to sustain BMIS.

---

[1] University Research Associate, Institute of Human Nutrition and Food-Barangay Integrated Approach for Nutrition Improvement, College of Human Ecology, University of the Philippines Los Baños, College, 4031 Laguna, Philippines
[2] Assistant Professor, Institute of Statistics, College of Arts and Sciences, University of the Philippines Los Baños, College, 4031 Laguna, Philippines
[3] Assistant Professor, Institute for Governance and Rural Development, College of Public Affairs and Development, University of the Philippines Los Baños, College, 4031 Laguna, Philippines
** Corresponding author: (+63 49) 536-3643; cpmaneja@yahoo.com.ph*

The identified significant individual factors that influenced the barangays' decision to sustain BMIS were the system's user-friendly features, ease in managing the BMIS software, and usefulness of data generated in performing the functions of the local government officials. The significant institutional factors that contributed to sustaining a Local Information System (LIS) were the active participation of the Barangay Council members in data management; the availability of budget and equipment; the presence of municipal and technical support from the municipalities and state universities and colleges; and the utilization of data in the submission of administrative reports, situational analysis for the preparation of plans, monitoring and targeting of beneficiaries; and the issuance of local ordinance for the adoption of LIS.

Recommendations include strengthening the process of policy preparation at the local level; organization of the LIS team; creation of positions for Information or Investment Officers; crafting of ordinances to support the budgetary requirements; and establishment of partnerships between SUCs and the LGUs.

Keywords: *information system, data management, data banking*

INTRODUCTION

In 1993, Executive Order (EO) 135 was enacted into law to establish a well-coordinated statistical system at the local level. It is the objective of EO for the official statistics at the municipal level to be harmonized with official statistics at the national level. Further, the EO would be responsive to planning and monitoring requirements at the local level.

The EO was created after the Local Government Code (LGC) was ratified on October 10, 1991. The EO ensures that the delivery of basic services devolved at the provincial, municipal and village government units are addressed. The LGC gives the Local Government Units (LGUs) power and responsibilities to implement their development plans, program objectives, and priorities to provide efficient and effective basic services and facilities (*Local Government Code: Book 3*, 1991).

With these devolved powers, the EO stipulates that the production of local-level statistics, the by-products of administrative reporting systems inherent in administering the devolved basic services, shall be continued by the LGUs. The continuation should be consistent with the manner, form, and frequency being adopted by the concerned national line agencies (EO 135 Sec. 3-b). For proper consolidation of the data produced, all LGUs are enjoined to establish their own databases in support of planning and programming activities at the local level.

The different databases introduced at the barangays were initiated by the different agencies. Currently, policy issuances and memorandum circulars were released by the National Anti-Poverty Commission (NAPC) En Banc Resolution No. 7; Department of Interior and Local Government (DILG) Memorandum Circulars 2003-92 and 2004-152; and NSCB Resolution No. 6, Series of 2005 to support the adoption of the Community-Based Monitoring System (CBMS). The CBMS is a monitoring tool to diagnose poverty at the local level as well as to localize the Millennium Development Goals (MDGs), which runs from 1990 to 2015. The MDG is a set of time-bound, measurable goals and targets for combating poverty, hunger, diseases, illiteracy, environmental degradation, and discrimination against women with 18 targets and 48 indicators. During the CBMS 6th National Conference, the key challenges for CBMS included the sustainability and expansion of its coverage.

One of the academe initiatives to help in these endeavors is the Barangay Management Information System (BMIS). It was introduced as one of the components of the Barangay Integrated Development Approach for Nutrition Improvement (BIDANI). The BMIS is a data-banking system on social, economic, ecological, sanitation, agriculture, health and nutrition designed for the municipal and barangay government units. The BMIS promotes evidence-based planning, and monitoring and evaluation of development programs/projects/activities of the LGUs. At present, the BMIS is adopted by 1,034 barangays in 34 municipalities of the provinces of Batangas, Laguna, Quezon in Region IV-A; Mindoro Occidental in Region IV-B; Iloilo in Region 6; Negros Oriental and Misamis Occidental in Region 7; and Leyte in Region 8. However, not all these municipalities and barangays have sustained BMIS.

Results of this study would guide policymakers and decision-makers, program sponsors and donors, program managers and staff, community members and organizations, and research communities in implementing and sustaining a local information system (LIS).

Generally, the study determined the factors associated with the likelihood that the barangays would sustain LIS. Specifically, it aimed to determine the individual and institutional factors that may influence in the decision of the barangays to sustain BMIS and LIS, respectively.

METHODOLOGY

The study was conducted in randomly selected barangays of the provinces of Batangas, Iloilo, Laguna, Leyte, and Quezon, where the BMIS was introduced. The 1,034 barangays trained by BIDANI on BMIS were classified as either continuing or non-continuing. A continuing barangay had an updated BMIS as of 2011

and a plan to update its BMIS for 2012. A non-continuing barangay had no updated 2011 BMIS and no plans as well to update its BMIS in 2012. The barangay and its municipality have the same classification since the Municipal Management Information System (MMIS) could not be up to date without the updated BMIS of its barangays.

Barangays were chosen using stratified random sampling in which the stratification variable was the classification of the area as continuing barangays or non-continuing barangays. The 180 randomly selected barangays comprised 90 continuing barangays and 90 non-continuing barangays.

The eligible respondents consisted of the BMIS managers, specifically the barangay chairpersons who led in the planning activities. If they were unavailable, the barangay secretaries served as alternatives because under the local government code, they are responsible for keeping the updated records of all the barangay residents. Of the 180 target respondents, only 158 (87.8%) responded: 90 from the continuing barangays and 68 from the non-continuing barangays.

Data were gathered using structured and pre-tested questionnaire for the survey and a key informant interview. Most of the questions in both instruments were patterned after the UNICEF 2006 DevInfo 4.0 questionnaire (see Rodriguez, 2007).

The framework of the study shows the factors associated in sustaining the BMIS (Figure 1). These consist of institutional contributions such as manpower resources, investment in machines, budget allotment, and provision of a Municipal Ordinance. The municipalities and barangays provide manpower resources and technical assistance to oversee the BMIS implementation. In addition, the person who manages the BMIS

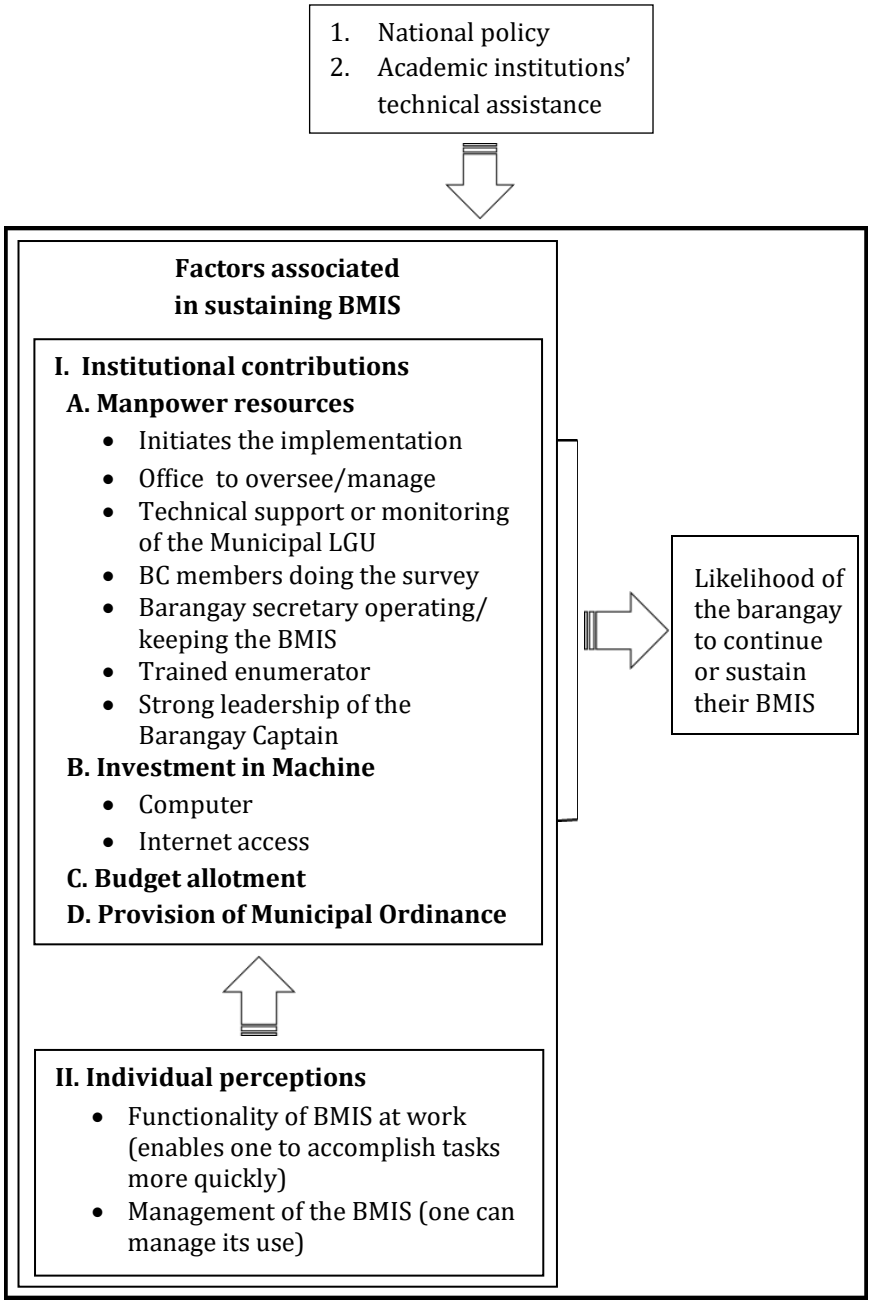

Figure 1. Conceptual framework of the study

should be willing to do the additional job and sees its importance in his/her work.

The participation and continuing support of the municipal government, barangay council members and other volunteer workers in the barangay in the operations of BMIS were assumed to be vital factors in sustaining local database. The LGU support could also be measured by the policy initiatives of the municipal and barangay government units by the provision of Municipal Ordinances.

These factors, in turn, are influenced by individual perceptions on the functionality of the BMIS at work and on its management.

All the above factors are influenced by national policies and technical assistance from institutions. The issuance of national policies towards the adoption of BMIS was expected to compel the LGUs to adopt and sustain BMIS. The academic institutions' role in capability building of the LGUs is an equally important factor in managing the BMIS.

To incorporate the sampling design and to compensate for the non-response, survey weights were computed for each responding unit. In the data analysis, percentage distribution was employed to describe the characteristics of the respondents and responses of the continuing and non-continuing barangays. The Chi -square-based correlation coefficients were calculated to determine the strength of association of the classification of barangays — whether continuing or non-continuing — with several factors. Moreover, to model the factors associated with the barangays' continuance or sustenance of their BMIS, a Binomial logistic regression model was applied.

RESULTS AND DISCUSSION

Respondents' Profile

Majority of those who managed the BMIS in the continuing and non-continuing barangays were females (72%). Majority were also college graduates (58%), while 22 percent were high school graduates. Their ages ranged from 22 to 81 years with a mean of 42 for those from the continuing barangays and 43 years from the non-continuing barangays. The BMIS managers had been serving their barangays for an average of 7 years with a range of one to 29 years (Table 1).

Institutional Factors Influencing Barangay's Decision in Sustaining BMIS

In 1997, when the BMIS was developed by the UPLB-BIDANI Network Program, there were no existing national mandates to adopt a sustainable statistical information system at the local level. Despite this, the number of barangays adopting and sustaining the BMIS increased. The BIDANI Network Program is one of the enabling mechanisms for expanding and sustaining BMIS.

The institutional factors that may possibly influence the sustainability of BMIS in the continuing barangays are listed in Table 2. Almost a fourth (23%) of the barangays declared that BMIS was initiated by the academe or State Universities and Colleges (SUCs) under the BMIS projects of the BIDANI Program. Despite the absence of national mandates, the LGUs initiated the establishment of BMIS in their areas. This was because more than half of the barangays (51.1%) cited that there are existing local policies to support its adoption. These policies include the municipal ordinances issued for the institutionalization of BMIS in

their locality, budget allotment for the purchase of computers and their maintenance, and budget for data updating. Majority (71.1%) of the continuing barangays assigned an office to manage the BMIS. Generally, the Municipal Planning and Development Office (MPDO) was the assigned office to oversee the over-all implementation of BMIS at the municipality. Most of the continuing barangays were able to implement and sustain BMIS even if they did not have specific budgets for BMIS.

Individual perceptions influencing the institution and BMIS managers' decisions in sustaining BMIS. People resist change when the reason for it is unclear, especially in their jobs (*Resistance to Change*, 2012). Ambiguity can trigger negative reactions among local users. According to the review of Information Technology Systems Development, conducted by the Joint Legislative Audit and Review Commission of the Virginia General Assembly (2003), it is important to identify the functional needs of the technology implementers to avoid project failures. Since BMIS is introducing a new technology, which require skills in data collection and encoding, and technical knowledge in data analysis, it is important to capacitate the BMIS end-users. However, learning the skills is only the first step, but it is not enough for the barangays to sustain BMIS. In this study, the individual perceptions of the BMIS manager were also considered to determine the governance in the sustainability of BMIS.

The study showed that many of the continuing barangays agreed that the presence of technical support or monitoring of the SUCs and municipal government units is significant in sustaining BMIS. The technical assistance is part of BIDANI's extension activity to ensure that the BMIS activities are well implemented, particularly for the BMIS managers who are just starting to learn to operate the computer. The municipal focal person should also ideally join the field visits to strengthen their competencies in

responding to the barangays queries. A large percentage of the BMIS managers agreed that the strong leadership of the barangay captain and the support of the barangay council members can contribute in sustaining the BMIS. They said that the BMIS will not be established if the barangay captain did not approve the BMIS activities.

Most of the BMIS managers agreed that the support of the barangay council members was important in collecting the data. With uncooperative members, either more time is needed to finish the BMIS or worse, the BMIS data would be incomplete.

The BMIS managers believed that the change in leadership was not a hindrance in sustaining the BMIS. Since not all the barangay council members were replaced, there were still members who had knowledge about BMIS. Further, the unavailability of a computer was not a hindrance to sustaining the BMIS as perceived by the BMIS managers.

Aside from technical support, the budget support from the municipality also played an important role in sustaining the BMIS. The financial support given to the barangays were spent more on the training and the reproduction of survey forms.

Moreover, more than half of the BMIS managers in the continuing barangays agreed that the BMIS helped them in performing their functions. The BMIS barangay managers agreed that using the BMIS accomplished their tasks quickly, improved job performance, increased productivity, and enhanced work effectiveness.

Factors associated with the barangays' decision to sustain LIS. Table 3 shows that among the significant factors associated with the barangays' decision to sustain the BMIS, were

the highly significant strong association in the perceived interest in using BMIS in terms of its functionality at work (r=0.515 with p-value of 0.000), improvement of job performance (r=0.499 with p-value of 0.000), and productivity of the barangay employees or workers (r=0.494 with p-value of 0.000). The BMIS initiated by the LGUs (r=0.184 with p-value of 0.023) and the allocation of budget for the BMIS activities also had significant associations with the barangay's decision to sustain BMIS (r=0.294 with p-value of 0.003).

Furthermore, the individual perceptions of the BMIS managers had significant contributions in sustaining the BMIS (Table 3). The BMIS managers' perceptions on the importance of the technical support or monitoring of the SUCs (r= 0.596 with p-value of 0.000), strong leadership of the barangay captains (r=0.343 with p-value of 0.000), support from the barangay council members (r=0.371 with p-value of 0.000) and financial support from the Municipal LGUs (r=0.394 with p-value of 0.000) were significant factors associated to the barangay's decision to sustain the BMIS.

Likewise, statistical analysis revealed that change in leadership was not significantly associated to the decisions of the barangays to continue BMIS because some of the barangay officials were re-elected and they realized the importance and contributions of BMIS for local development. However, there was a need to orient the new set of barangay council members about the BMIS.

Factors affecting the probability of barangays to sustain a Local Information System (LIS). Sustainability of LIS at the municipal and barangay levels should always be considered in establishing a LIS because it requires large amount of money and time.

The binary dependent variable, defined as continuing or non-continuing, was regressed to the several factors considered in the study. Table 4 shows which among the variables were significant in predicting the likelihood of a barangay to continue BMIS. Since the Likelihood Ratio Chi-Square Test is significant at 10 percent level of significance, the model is adequate.

At the institutional level, as shown in Table 4, the strong technical support or monitoring of the municipal LGU was one of determining factors in LIS sustainability (with p-value of 0.043). The individual perceptions that LIS was manageable (with p-value of 0.30) and using the LIS accomplished their task more quickly (with p-value of 0.011) were also established to be significant in the model.

The role of the barangay council (with p-value of 0.000) in doing the survey and of the barangay secretary (with p-value of 0.019) was again noted to have significant contributions in determining the probability of sustaining a LIS.

The study showed that the strong leadership of the barangay captain was significant (with p-value of 0.004), the local chief executives should have complete knowledge and support in implementing the BMIS is important to sustain the LIS.

Trained enumerators were not associated, and this was affirmed by the study of Maneja (2013) who said that the BMIS enumerators were BNS, BHW, volunteer workers, and hired enumerators. There was no assurance that these enumerators would be the same group who would conduct the census in the succeeding years. However, if the barangay council members did the survey, it would significantly contribute to the likelihood that a LIS would be sustained.

The fitted model in predicting the likelihood of a barangay to continue based on general indicators is given by:

Logit (continuing) = + 2.565 (technical support or monitoring of the municipal LGU) + 1.719 (I can manage BMIS) + 6.250 (I can perform job quickly using BMIS) + 2.117 (BC members did the survey) + 2.177 (barangay secretary operates/keeps BMIS) – 1.525 (trained enumerators) – 6.211 (barangay strong leadership)

Based on the fitted model, a barangay can sustain its BMIS if the barangay has technical support and the members can manage the BMIS and use BMIS in their jobs, if the BC members did the survey, or if the barangay secretary managed the BMIS. Among these significant factors, a barangay will sustain its BMIS six times higher rather than discontinue it if the barangay can see the use of the BMIS in accomplishing its tasks. However, the logistic regression revealed that likelihood of continuing a BMIS was lower if the barangay had trained enumerators and if their barangay had strong leadership.

CONCLUSION

The facilitating factors in implementing and sustaining a BMIS included the degree of interest of the barangays; capacity development of the enumerators and data encoders; technical as well as financial support from the municipal government units; the active LGU staff and strong leadership of the barangay captains; and involvement of the council members, barangay captains, barangay secretaries, and volunteer workers. Likewise, the factors associated with the possibility of the barangays adopting the BMIS included technical support from the municipal government in the barangays; the individuals' insight on the usefulness and convenience of the BMIS to facilitate tasks/activities; and the role

of the barangay council members and barangay secretary in data collection and in managing the BMIS, respectively.

RECOMMENDATIONS

LIS at the barangay level is feasible and doable, and it can be sustained in large and small populated municipalities and barangays. Suggestions include the following:

1. *Municipal LGU should give technical support and regular monitoring.* The budget for the LIS capability building and data generation should be in place. The barangays should invest in computers to facilitate data encoding and updating.

2. *Give orientation on how to manage the BMIS.* The municipal and barangay LGUs should be properly oriented on the LIS investments and workload. The barangay should also be willing to learn.

3. *Make the BMIS useful in the job of the community members.* The government and other agencies implementing LIS should be responsible in creating awareness on the importance of LIS in the barangays. It should be user-friendly and functional at the LGUs workplace. There should be continuous dissemination on how to use the BMIS in the delivery of services, preparation of plans, and conduct of monitoring and evaluation of their program/plans/activities.

4. *The barangay captain and the council members must be knowledgeable on the importance of the BMIS; the barangay captain should also include one of his plans for the barangay the sustainability of the BMIS.* Approval of a

local resolution can facilitate the sustainability of LIS in the barangay because of the allotted budget for the regular updating of the BMIS. Likewise, sharing of data to the public and making these accessible to the data users may help the barangay captain and council members to be aware of the LIS and its importance in advocacy and linkages.

The following are recommended to strengthen the institutional and individual support in sustaining the BMIS:

Individual Factors

1. Conduct conferences or forum on the process of policy analysis for the preparation of local ordinances by the legislative members and execution of local chief executives. The discussion will emphasize the utility of the BMIS in identifying policy problems, listing courses of action, monitoring of actions and evaluation of policy performance.

2. Conduct capability building activities of the LIS team on data collection, field data cleaning, encoding, validation, and data updating with continuous monitoring of LIS by the municipal LIS team and SUC partner.

Institutional Factors

1. Create positions for Information or Investment Officers who will be responsible for the provision of technical assistance in the production of statistical data at the local level (as indicated in the roles and functions in the LGC and DILG MC 2010-113, respectively) to achieve the strong technical support of the municipalities.

2. Advocate the passing of municipal and barangays ordinances to support the budgetary requirements for sustaining the operations of the LIS.

For future researches, it is suggested that an evaluation study on the current local information system initiated by the LGUs and introduced by the national agencies, academic and other private institutions should be done. A documentation of the current LIS' best practices should be made to further determine the factors in sustaining other models of LIS, the cost-effectiveness in establishing an LIS, and the utility in performing the LGUs' functions.

ACKNOWLEDGEMENT

The lead author is grateful to Dr. Aser B. Javier and Prof. Rolando T. Bello for their valuable contributions as members of her guidance committee; to Belinda A. Lalap, Pamela A. Gonzales, Marcelina C. Miranda, Lorna O. Garcia, and Ana B. Castañeda for their technical assistance; and to the following for their help in data collection: Ms. Saloma Gisulga (Visayas State University-BIDANI), Ms. Josephine Firmase and Mr. Marianito Ramirez (UP Visayas-BIDANI), Mr. Joevan Jareño (Rosario, Batangas), Mr. Rudolph Jacob (Infanta, Quezon), Lelit Narvarez (Ozamis City), Ms. Fe Urriquia (Rizal, Laguna), Ms. Beng Agana (Pangil, Laguna), and Ms. Lourdes Commendador (Nagcarlan, Laguna).

REFERENCES

Joint Legislative Audit and Review Commission of the Virginia General Assembly. (2003). Retrieved from Information Technology Systems Development, Commonwealth of Virginia: http://jlarc.virginia.gov/reports/Rpt289.pdf

Local Government Code of the Philippines: Book 3. (1991). Retrieved from Chan Robles Virtual Law Library: http://www.chanrobles.com/localgov3.htm

Maneja, C. P. (2013). Challenges in Sustaining a Local Information System: The Experience in the Establishment of Barangay Management Information System (BMIS) in Selected BIDANI Covered Areas in the Philippines. University of the Philippines Los Baños.

Resistance to Change. (2012). Retrieved from University of Wisconsin-Milwaukee: http://www4.uwm.edu/cuts/bench/change.htm

Rodriguez, A. (2007). Use of DevInfo in the Philippines. Paper presented during the 2007 International Conference on the MDG Statistics, October 1-3, 2007, Shangri-La Plaza, Manila, Philippines.

TABLES

Table 1. Summary statistics of observed characteristics of BMIS managers

POSITION	CONTINUING %	NON-CONTINUING %	TOTAL %
Sex			
Female	70.0	75.0	72.2
Male	30.0	25.0	27.8
Total	100	100	100
Educational attainment			
College undergraduate	61.1	54.4	58.2
High School undergraduate	14.4	32.4	22.2
Vocational graduate	11.1	4.4	8.2
High School graduate	6.7	0	3.8
Elementary graduate	0	2.9	1.3
Postgraduate	1.1	0.0	0.6
No answer	5.6	5.9	5.7
Total	100	100	100
Age			
Minimum	22	22	
Mean	42	43	
Median	43.5	43	
Maximum	81	63	
Years of service in the barangay			
Minimum	0	1	
Mean	7	7	
Median	10	9.5	
Maximum	24	29	

Table 2. Institutional factors that sustained BMIS in the continuing barangays

FACTORS	PERCENT DISTRIBUTION (n=90)
Institutions that initiated the BMIS	
Municipal and Barangay Government Unit	72.2
National agency	6.7
Academe/University/College	23.3
Private Institution	4.4
Existence of local policy	
Yes	51.1
No	48.9
Total	100
Assigned office to manage BMIS	
Yes	71.1
No	28.9
Total	100
Office that manages the BMIS	
Municipal Planning and Development Office	66.7
Barangay LGU	17.8
MIS Office	8.9
Social Welfare and Development Office	2.2
Municipal Health Office	2.2
Population Management Office	1.1
Mayor's Office	2.2
Status of BMIS Budget allocation	
With budget	37.8
No budget	62.2
Total	100

Note: Multiple responses

Table 3. Association of institutional factors and individual perceptions with the barangays' decision to sustain the BMIS

FACTOR	P-VALUE	CRAMER'S V COEFFICIENT
Institutional factors		
Institutions that initiated the BMIS	0.023*	0.184
BMIS Budget	0.003*	0.296
Individual perceptions		
Affecting institution		
Technical support or monitoring of the State University and Colleges	0.000*	0.000*
Technical support or monitoring of the Municipal LGU	0.000*	0.000*
Strong leadership of the Barangay Captain	0.000*	0.000*
Support from the Barangay Council members	0.000*	0.000*
Budget support from the Municipal LGU	0.000*	0.000*
Change in leadership due to election	0.653	0.653
Affecting the BMIS managers		
Using the BMIS in my job enabled me to accomplish my tasks more quickly	0.000*	0.000*
Using the BMIS improved my job performance	0.000*	0.000*
Using the BMIS increased my productivity	0.000*	0.000*
Using the BMIS enhanced my effectiveness	0.000*	0.000*
BMIS is not necessary in my line of work	0.006*	0.006*

* Significant at $\alpha = 0.10$

Table 4. Estimated parameter of the logistic regression model in sustaining BMIS

PARAMETER	ESTIMATE (B)	STANDARD ERROR	P-VALUE
Intercept	4.283	3.776	0.257
Technical support or monitoring of the Municipal LGU	2.565	1.269	0.043*
Respondent can manage the BMIS	1.719	0.794	0.030*
Using the BMIS in the respondent's job enabled him/ her to accomplish his/her tasks more quickly	6.250	2.459	0.011*
BC members did the survey	2.117	0.577	0.000*
Barangay secretary operates/ keeps BMIS	2.177	0.925	0.019*
Trained enumerator	-1.525	0.826	0.065
Strong leadership of the Barangay Captain	-6.211	2.174	0.004*

* Significant at $\alpha = 0.10$