A MULTI-PERSPECTIVE EFFECTIVENESS EVALUATION METHODOLOGY FOR MGOVERNMENT (MPE^{2}M-mG)

Tarek El-Kiki
Faculty of IT, University of Technology Sydney
tarek@it.uts.edu.au

Elaine Lawrence
Faculty of IT, University of Technology Sydney
elaine@it.uts.edu.au

ABSTRACT

The benefits, which can also be considered as incentives or drivers, of implementing mGovernment services, include increasing effectiveness of government processing (back office) and services (front office). The objective of this study is to identify a method that best assesses and measures the effectiveness of mobile services (mServices) rendered by mGovernment entities, regardless of the type of the end-user. It has been developed as a follow-on to the generic management framework developed by the researchers to guide government in managing the adoption of wireless and mobile technologies for the implementation of mGovernment services. The Adaptive Management Approach is combined with two measurement methodologies to produce a Multi-Perspective Effectiveness Evaluation Methodology for mGovernment (MPE^{2}M-mG).

KEYWORDS

mGovernment, effectiveness, evaluation, mobile, services, management.

1. INTRODUCTION

Effectiveness may be defined as the extent to which the goals of a certain policy measure have been achieved. A government initiative measure is said to be effective if the goals are reached, i.e. if the outcomes match with the goals. Government is said to be effective when it renders its services to its constituents, and produces a desired result . Effectiveness evaluation is used to describe the relationship between inputs and desired outcomes, that is, between the amount of resources used and the desired effect or result achieved by a project or program (The City of Norfolk VA 2005). According to Paul Epstein (1998) "effectiveness measures service responsiveness to public needs and desires; service quality is an important effectiveness consideration". Accordingly, in order to evaluate effectiveness of mGovernment services both of the inputs and outcomes have to be defined and then evaluated and measured as accurately as possible.

Inputs are the resources that are provided by the mGovernment. Implementing these resources creates opportunities but also provides challenges. For example, a monetary amount, human capital or a tax deferral is considered an input once it is provided as a resource by the government. Although each input would, or could help to, create certain opportunities (such as more employment or the establishment of a small or medium size business (SME)) certain challenges would still be apparent such as the lack of institutional guidance or strategic thinking. On the other hand, outcomes of a process are 'something that follows as a result or a consequence' (Merriam-Webster) from the outputs. An increase in competitiveness, or growth in economy are examples of outcomes. As outcomes bring in benefits which achieve the initial goals, they also invoke some risks, for example, security risks associated with wireless technologies, financial risks linked with the purchase of expensive and easily stolen mobile devices as well as probable interoperability problems.
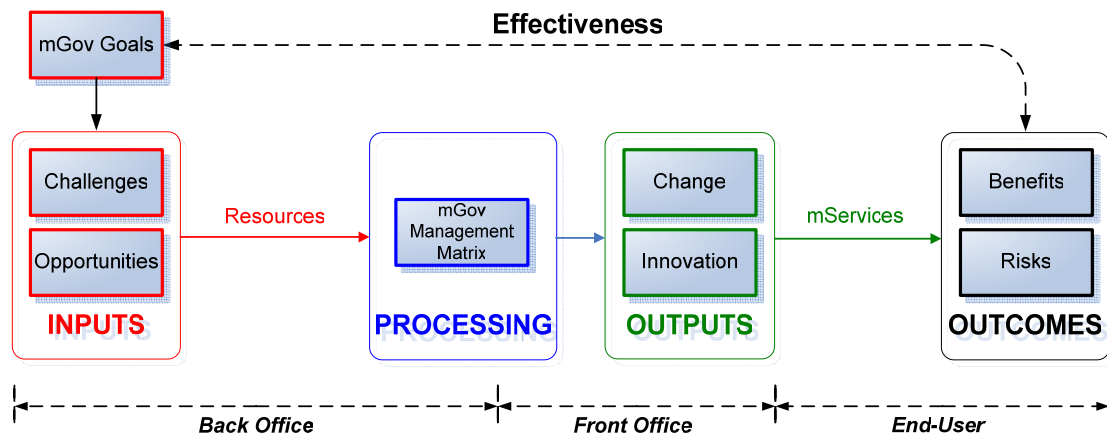
Figure 1. Effectiveness as a relation between inputs and outcomes. Source: Adapted from El-Kiki et al 2005

Inputs of the mGovernment are practically processed at the 'back office', whilst outcomes are the results gained from the services rendered by the 'front office' as shown in Figure 1. The mGovernment back office undertakes all the activities and processes in order to produce a service, such as finance, human resources, Information Technology (IT) support, facilities management, marketing and communications. Front office activities and processes cover the supply of a service to the end-user, who can be any of the mGovernment constituents, i.e. citizens, businesses or other government agencies.

Effectiveness evaluation, as one of the elements used to measure performance, covers all of the activities performed by both back and front offices to produce a service. As a management tool used to assess whether policies, regulations or measures meet their intents based on evidence of their outcomes, evaluation should not only focus on whether the mGovernment goals have been achieved, but it should also bring together all of the stakeholders who affect or participate in making policies producing a service. The Bournemouth Council in England have implemented use of mobile devices to assist in council decision making. Each weekend Council cabinet members may quickly outline their plans for the town to a public audience at the university. The audience then vote on the proposals using key pads, with other votes coming in by e-mail, text and online. The council believes this is one way to check if they are satisfying the people's need for information and to engage young people with this method, although it is open to all age groups (Textually.org 2005).

Wohltorf & Albayrak (2003) adumbrate eight benefits which an end-user seeks in order to accept an mService: mobility, pastime, information quality, efficiency (time & money), spontaneity, convenience, currency (up-to-date) and reachability (own & others). These benefits accompanied by risks, are the two types of outcomes which are inherent in any major mobile and wireless project. Loudon & Loudon (1991) argue that risk is taken to be a negative outcome that has a known or estimated probability of occurrence based on experience or some theory. This negative outcome becomes a 'silent problem' when it is relevant to stakeholder concerns and interests (Willcocks and Margetts 1994).

On the other hand, outputs are the direct effects of mGovernment management processing such as an increased number of activities or services, or a better-educated workforce. Increasing the number of services or introducing a new service is viewed as the response to the processing which can take the shape of change and/or innovation (El-Kiki, Lawrence et al. 2005). Comparing outputs with outcomes, outputs are usually much more practical to measure than outcomes, and can be more useful in specifying responsibility. Outputs are also, usually, easier to cost than are outcomes, as outcomes are indirect and affected by several variables (UN Expert Group 2003).

A successful multi-perspective effectiveness evaluation methodology for mGovernment services must be available to analyse what the end-users' desired benefits are, and what their silent problems could be, and what should be done to deal properly with both. This evaluation will measure the end-user satisfaction which is an essential factor in both analysing the current, and predicting the potential, mGovernment audience. Accordingly, this study will help to provide answers to questions such as:

1. To what extent will policy, program or initiative goals and objectives be defined and achieved when applied to mGovernment services?
2. Are there other or alternative methods for achieving those goals and objectives?
3. To what extent does the evaluation lead to more Research and Development (R&D) activities at the mGovernment management level?
4. What is the influence of the type of end-user, service, and sector and R&D activities on innovation and change for a certain government agency if it provides mobile services?
5. What is the adequacy of the quality of the mServices provided relative to the citizens' needs, desires and willingness to pay?
6. Are resource values being maintained by offering mGovernment services?
7. Are citizens' trust, privacy and security concerns being addressed adequately?

In addition, for the sake of simplifying the idea of this study, not all the inputs or outcomes of an mGovernment service are considered. Accordingly, the effectiveness assessment product aims to provide an initial indication rather than an authoritative evaluation. Part 2 of the paper provides a background overview of measuring effectiveness and part 3 outlines the methodology of the paper. Part 4 describes the multi-perspective mGovernment Effectiveness Evaluation Methodology while the conclusion and future directions are contained in Part 5.

2. BACKGROUND ON EFFECTIVENESS MEASUREMENT APPROACHES

The following review for methods and approaches evaluating governmental policies is provided by Evert Vedung (2000) in Table 1. These methods expound the basic concepts for designing an evaluation process without handling the technical details pertaining to data collection and analysis.

Table 1. A summary of some effectiveness measurement methods (adapted from Vedung, E. 2000)

Effectiveness Evaluating Method	Explanation & Comments
Goal-attainment Model	- basic evaluation approach - evaluator judges whether the goals of the program have been reached - effects are a result of the support measures.
Side-effects Model	- takes the goals of the support measure into account - examines both positive and negative side effects.
Goal-free Evaluation Model	- assesses the effects of an (economic) intervention - ignores the objectives of the measure, - believes pre-occupation with the objectives of the measure narrows the view of th evaluator.
Comprehensive Evaluation Model	- incorporates the implementation - sometimes involves the planning process of the support measure in the evaluatior - may include parts of the intervention other than the outputs and outcomes, such a the processes of implementation and feedback.
Client-oriented Model	- may include clients' (or beneficiaries') goals, expectations, concerns or needs as the criterion of merit. - based on whether a measure satisfies the clients' concerns and expectations - in contrast with the question whether the measures' goals have been met. - market-drive perspective acknowledges the fact that recipients' objectives and drives do not necessarily coincide with the programme management's goals.
Stakeholder Model	- acknowledges the effects of the intervention in the recipients' clients, competitors suppliers. - organises an evaluation around the organisations (people) that have an interest in or are affected by the intervention.
Policy Commissions	- Swedish alternative to the stakeholder approach - stakeholders are not consulted but perform the evaluation. - stakeholders invited by the government to participate in an ad hoc policy

	commission to advise the government on the effectiveness of the scheme.
	• government does specify the issues that should be part of the evaluation, but does not interfere with its completion.
	• policy commissions are future-oriented.
	• commissions' analyses are focused much more on alternatives for future action than on impacts of past policies.
	• in practice, the work of these policy commissions is much more a political enterprise than thorough research work.
Cost-effectiveness	• economic approach
	• measures inputs in purely estimated monetary terms
	• outcomes are measured in terms of actual impact
	• inputs and outcomes are divided in such as way that the cost per unit of outcome quantified.

3. STUDY METHODOLOGY

This paper represents the next stage in our study of the potential of mGovernment to provide effective services to constituents of a state or country (El-Kiki, Lawrence et al. 2005). The focus of our initial literature review concentrated on existing response models for mGovernment. Academic databases, mainly Proquest and Computer and Information Systems Abstracts (CSA), were consulted to search for papers that dealt with the impact and response of either ICT or wireless and mobile technologies on government. Kushchu and Borucki (2004) devised the Mobility Response Model; another useful framework for mobile government was developed by Goldstuck (2003) and the authors devised a generic framework in (El-Kiki, Lawrence et al. 2005).

As mGovernment is a new area of research, there are very few completed studies, so exploratory research is a legitimate methodology (Hussey and Hussey 1997). Such exploratory research assists in establishing the theoretical foundation for further examination and has been vital in developing a viable, theoretical framework as set out in our previous paper (Sekaran 2003) and which is further expanded in this paper.

It became apparent to the researchers that the measurement of effectiveness for mGovernment services such as mobile payment for mGovernment services (Mallat, Rossi et al. 2004), would be of vital importance if the delivery of such services is to be handled by mobile devices which currently face such technical challenges as handover, roaming, dropout, lack of technical standards and security issues.

Our investigations have resulted in a new evaluation methodology which is the result of applying the Adaptive Management Approach or AMA (Holling 1978) to a combination of two measurement tools called Goal/Question/Metric or GQM (Solingen and Berghout 1999), and Balanced Scorecard Approach or BSA (Kaplan and Norton 1992). We have called this new evaluation methodology Multi-Perspective Effectiveness Evaluation Methodology for mGovernment (MPE2M-mG) as in figure 2.
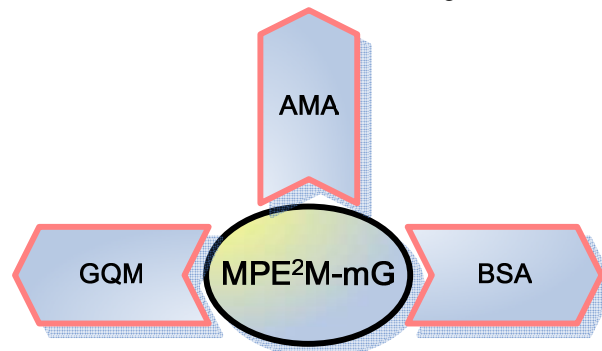

Figure 2. Multi-Perspective Effectiveness Evaluation Methodology for mGovernment

Adaptive management is a formal, systematic and rigorous approach to learning from the outcomes of management actions, accommodating change and improving management. It involves synthesizing existing knowledge exploring alternative actions, and making explicit forecasts about their outcomes. The key

characteristics of adaptive management (Nyberg 1998) are set out below and explained in the context of providing an mGovernment service such as Table 2:

Table 2. AMA applied on mGovernment in Hungary. Source: Derived from Information Policy (2004)

Key	Result and examples	mGovernment in Hungary
Acknowledgement of uncertainty about what policy or practice is "best" for the particular management issue.	Public authorities developed mobile government services through SMS and WAP technologies.	This is undertaken because Mobile phone penetration rate is 81% (in contrast with 30% for computers).
Thoughtful selection of the policies or practices to be applied.	Hungarian Government Introduced mobile phones into public administration procedures.	Mobile phones are a highly inclusive technology in Hungary.
Careful implementation of a plan of action designed to reveal the critical knowledge.	A special vehicle history report available via a premium rate SMS service run by the Hungarian Ministry of Interior.	For the sake of effectively communicating with different constituents.
Monitoring of key response indicators.	A diversity of data may be collected from the above and from other mServices introduced in Hungary e.g. - Payment of parking fees - Notification of school results and processed forms - Application to use public premises	Currently implementing methods for monitoring the effectiveness of these applications.
Analysis of the outcome in consideration of the original objectives	By implementing quantitative methods e.g. log files and statistics analyses (regression, factor, variance, etc); and qualitative methods e.g. questionnaires, best practices, SWOT and historical analyses.	Has the special vehicle history report available via a premium rate SMS service run by the Ministry of Interior been effective? What is the effectiveness of the other mServices?
Incorporation of the results into future decisions.	Maximizing benefits by adding a new mService, modifying or terminating an existing one.	Could mobile voting be added to the list of mServices offered by the government?

Meanwhile, GQM defines a certain goal, refines this goal into questions, and defines metrics that should provide the information to answer these questions. By answering the questions, the measured data defines the goals operationally, and can be analysed to identify whether or not the goals are attained. This GQM defines metrics from a top-down perspective and analyses and interprets the measurement data bottom-up (Solingen and Berghout 1999). The researchers found that this method would be suitable for adaptation for the measurement of effectiveness of mGovernment services such as the Hungarian examples found in Table 2. Accordingly, in order to derive proper indicators and metrics we have developed an approach which is defined on the basis of GQM paradigm by Basili & Weiss (1984), as explained in part 4.

Balanced Scorecard Approach is another framework for measuring and evaluating performance from a management system perspective. It is meant to be a management system, and not only a measurement system, to provide feedback around both the internal business processes and external outcomes in order to continuously improve strategic performance and results. This approach takes four perspectives: customer (citizen & business) perspective, operational / internal business process perspective, innovation / learning perspective, and financial /economic perspective. Thus In the Bournemouth Council and the Hungarian mGovernment services examples, management would need to measure and evaluate their systems from these four perspectives. Both GQM and BSA are combined to work on the evaluation step of the AMA, as the next section details this new method for evaluating the effectiveness of mGovernment services.

4. MULTI-PERSPECTIVE EFFECTIVENESS EVALUATION METHODOLOGY FOR MGOVERNMENT (MPE^{2}M-mG)

The researchers propose the following as suggested steps for a complete effectiveness evaluation process for mGovernment services. Authors adopt AMA and adapt it as the backbone framework for effectiveness evaluation process. The provision of mobile payment for a government service such as payment of parking

fees to a Council, as a typical mGovernment service, is used as an example. Figure 2 illustrates six cyclic steps which actualize the concept of AMA.
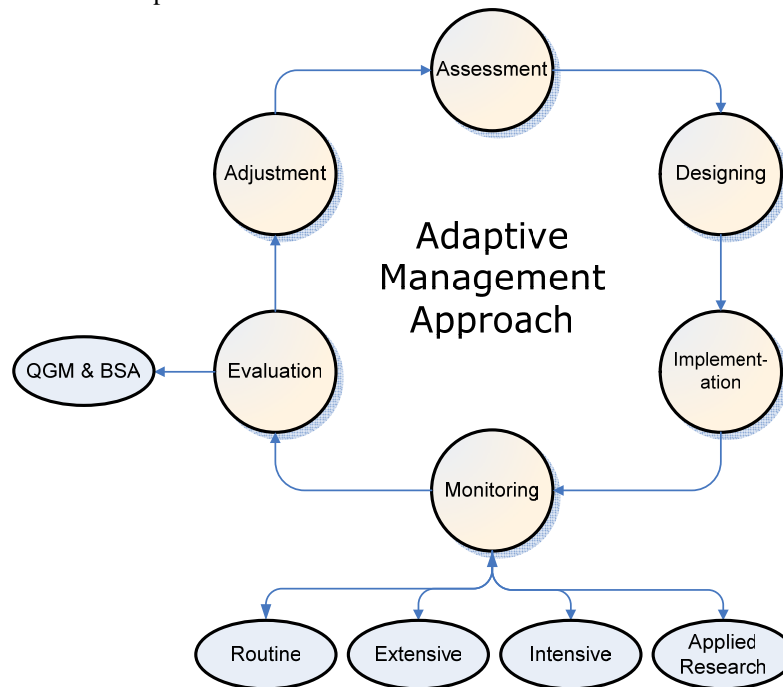

Figure 3. Effectiveness evaluation process implementing AMA. Source: Adapted from J.B. Nyberg (1999)

4.1 Problem Assessment (Research Question)

The scope and dimensions of the mService effectiveness problem are defined, usually in a form of a question. The basic research question for our 'mobile payment for a government service' example would be: does it work? Accordingly, additional questions should be derived covering the scope and dimensions of this mService. Those questions will lead to, or be translated into, goals, and, in turn, goals will lead to deriving metrics which are used in the evaluation step. In fact, this is how the QGM approach is initiated. Examples for additional questions for the Hungarian applications such as the parking payment could be:
- to what extent are the goals and objectives of this service defined and achieved?
- to what extent are allocated resources used for this service?
- to what extent are the end-users satisfied using this service? (Refer to Table 2)

4.2 Designing a Management Plan

A management plan and monitoring system is designed for capturing reliable data about the effectiveness of the mPayment service provided by mGovernment. Issues and assumptions are made explicit at this step, in order that the policy makers and evaluators make suitable decisions regarding the data to be collected which mainly depend on aspects that need to be analysed, and the methods with which that data are analysed. For example how many citizens are paying via their mobile device in the Hungarian example, is it cost effective, is it only reaching the young people etc? This means that this step results in a model which is used to describe the support, measure and provide evidence of the measure's effect (European Commission 1997). This can be done using both quantitative (objectives) and qualitative (subjective) methods. Log files and statistics are examples of the quantitative methods, whilst questionnaires, best practices and historical analyses are examples of the qualitative methods, which also tend to be cognitive. The collected data could be:
- qualitative and/or quantitative data by interviewing users of the mobile service application and/or collecting user statistics for the mobile service;

80

- primary or secondary data for example by examining other mGovernment initiatives in other countries

4.3 Implementation

Both management plan and monitoring system are put into action. In this case it might be useful to follow the advice of Rheingold (2005) who suggests that employers should be questioning their 21 year old newly hired employees to learn about mobility. Does the mGovernment service plan and monitoring system take into account the people who are using the service?

4.4 Monitoring

Monitoring determines how effective actions have been in meeting the objectives of the effectiveness evaluation. Varying arrays of questions impose different monitoring intensities as follows:
- Routine: such as using yes/no questions.
- Extensive: such as using categories like good, fair and poor.
- Intensive: more detailed quantitative data collection.
- Applied research: such as a controlled approach for example using an ethnographic researcher to follow and observe the users in action.

4.5 Evaluation

Collected data do not mean the solution to the research questions created at the first step. Analysing and evaluating these data reveal the answers which will be interpreted into decisions and actions by the decision makers and evaluators. At this step the authors suggest the following tool that facilitates a thorough analysis and evaluation of an mService effectiveness. This tool is the combination of both QGM and BSA approaches as mentioned previously. If it is applied to mobile payment for a government service, as an example, it must detail goals from four different perspectives (citizens/businesses, operational/internal business, innovation/learning and financial/economic). These goals are considered the answers to questions set at the first step, which represents the conceptual level of the QGM approach. The operational level of QGM assigns indicators to each goal. In turn, every indicator is interpreted into metrics at the quantitative level. Table 3 illustrates this MPE^2M-mG methodology. It is worth mentioning that only examples of goals, indicators and metrics are included, which means more detail must be handled in a real case study. The sum of all metrics values is represented by 'V', which means a numeric figure measuring the effectiveness of this mService.

Table 3. A Multi-Perspective Effectiveness Evaluation Methodology for mGovernment

QGM / BSA	Conceptual Level	Operational Level	Quantitative Level															
Perspectives	Goals	Indicators	Metrics															
			MT1	MT2	MT3	MT4	MT5	MT6	MT7	MT8	MT9	MT10	MT11	MT12	MT13	MT14	MT15	Totals
Citizens / Businesses	Value for money	Pricing	(A)															(A)
			(B)															(B)
	Quality of Service	Availability		(A)														(A)
				(B)														(B)
		Reliability			(A)													(A)
					(D)													(D)
		Accuracy				(A)												(A)
		Responsiveness					(A)											(A)
		Courtesy and Helpfulness						(A)										(A)
	Efficient Transaction	Usability							(A)									(A)
									(B)									(B)

Perspective	Objective	Attribute																V
		Timeliness							(A)									(A)
		Privacy								(A)								(A)
										(B)								(B)
		Security									(D)							(D)
	Strategic Data	Accountability										(A)						(A)
Operational / Internal Business	Citizens' & Businesses' Satisfaction	Productivity											(A)					(A)
													(B)					(B)
													(C)					(C)
		Interoperability												(A)				(A)
		Technology													(A)			(A)
															(B)			(B)
Innovation / Learning	New mPayment Facilities	Productivity											(A)					(A)
													(B)					(B)
													(C)					(C)
		Usability						(A)										(A)
								(B)										(B)
	Better Operational Efficiency	Availability		(C)														(C)
				(D)														(D)
				(E)														(E)
				(F)														(F)
		Reliability			(B)													(B)
					(C)													(C)
					(E)													(E)
		Accuracy				(A)												(A)
		Responsiveness					(B)											(B)
							(C)											(C)
							(D)											(D)
		Security									(A)							(A)
											(B)							(B)
											(C)							(C)
											(E)							(E)
	More Value for Constituents	Usability						(A)										(A)
								(B)										(B)
		Timeliness							(B)									(B)
Financial / Economic	Value for money	Profitability	(A)															(A)
			(B)															(B)
	Reduced Cost																(A)	(A)
	Economic Growth																	

Value of Mobile Payment Service Metrics		V
MT1	(A) Percentage of mPayment service charges to those of other ordinary methods of payment	
	(B) Percentage of reduction in costs	
MT2	(A) Customer uptime percentage	
	(B) Number of disconnections	
	(C) Number of repeat disconnections	
	(D) Number of unplanned disconnections	
	(E) Number of "maintenance events"	
	(F) Number of planned disconnections	
MT3	(A) Failed service attempts percentage	
	(B) Service downtime percentage	
	(C) Dropped transactions percentage	
	(D) Failed transactions percentage	
	(E) Failed user disconnects percentage	
MT4	(A) Number of errors	
MT5	(A) Average help desk response time	

	(B) Average one-way delay/latency
	(C) Average round time delay/latency
	(D) Average response time
MT6	(A) Degree of satisfaction
MT7	(A) Degree of understandability
	(B) Degree of learnability
MT8	(A) Degree of citizen's perception of on-time transactions
	(B) Percentage of transactions completed by due date
MT9	(A) Size-of-anonymity-set metrics
	(B) Entropy-based metrics
MT10	(A) Number of security breaching incidents reported externally to law enforcement (Office of Management and Budget 1996)
	(B) Percentage of transaction that had formal risk assessments performed and documented
	(C) Percentage of total transactions that have been processed following certification and accreditation
	(D) Percentage of perceived security
	(E) Percentage of employees with significant security responsibilities who have received specialized training
MT11	(A) Accountability-for-result metric
MT12	(A) Number of transactions per (period of time)
	(B) Number of finalised transactions per (period of time)
	(C) Number of transactions per employee
MT13	(A) Level of Systems Interoperability (LISI)
MT14	(A) Type of facilities offered by the technology
	(B) Ubiquity degree of the technology
MT15	(A) Return on Investment (ROI), (services targeted at businesses tend to have higher usage than those targeted at citizens and, consequently, deliver the highest value (Accenture 2003).

The evaluation step concludes with a comparison between the resulting value V and a threshold value established as a measuring criterion by decision makers and evaluators, as follows:

- Less Effectiveness: $V_{new} < V_{threshold}$
- Same Effectiveness: $V_{new} = V_{threshold}$
- More Effectiveness: $V_{new} > V_{threshold}$

Based on this comparison, decisions are made to continue, adapt or terminate this mService.

4.6 Adjustment

In reality, additional, and unplanned-for, results and ideas may be generated during the evaluation process. For example, the idea of how this mService could be improved, or why it should continue if it does not prove effective or fulfil its goals. These results and ideas should be included in the final evaluation report as they may provide significant perception about the general performance of the mService. Hence, adjustment to the management plans, monitoring systems, objectives and models created at the second step (designing) is crucial to reflect different understanding and forecasting for more realistic measuring criteria.

5. CONCLUSIONS AND FUTURE DIRECTIONS

This study proposed a methodology to assist in the evaluation of the effectiveness of mGovernment services. By interpreting questions about the effectiveness of an mService into goals, indicators and metrics are derived. An intuitive, sequential and simple evaluation approach is implemented utilizing the Adaptive Management Approach. Quantitative and qualitative methods should be used to gather data for the evaluation step. As effectiveness measurement means criteria that result from the evaluation process, these criteria will also used as thresholds future indices and benchmarks.

Further research will focus on conditions of applying the effectiveness evaluation methodology discussed in this study, and how the performance of mGovernment, in general, can be affected once this element (effectiveness) is adjusted to a certain rate. Our next step will be to apply the methodology to an existing mPayment, mGovernment service to test its viability.

REFERENCES

Basili, V. R. and D. M. Weiss (1984). "A Methodology for Collecting Valid Software Engineering Data." IEEE Transactions on Software Engineering SE-10(6): 728–738.

El-Kiki, T., E. Lawrence, et al. (2005). A Management Framework for Mobile Government Services. CollECTeR.

Epstein, P. D. (1998). Using Performance Measurement in Local Government. New York, National Civic League Press.

European Commission (1997). Evaluating EU Expenditure Programmes. A Guide. ex post and Intermediate Evaluation, DG XIX.

Goldstuck, A. (2003). Government Unplugged, Mobile and Wireless Technologies in the Public Service, Centre for Public Service Innovation, in partnership with Technology Research (State Information Technology Agency) Council for Scientific and Industrial Research - icomtek.

Holling, C. S. (1978). Adaptive environmental assessment and management. Chichester, John Wiley and Sons, Ltd.

Hussey, J. and R. Hussey (1997). Business Research methods: Qualitative and Quantative Approaches, USA Pearson Education.

Information Policy (2004). Information Policy. 2005.

Kaplan, R. S. and D. P. Norton (1992). The Balanced Scorecard – measures that drive performance. Harvard Business Review: 70-79.

Kushchu, I. and C. Borucki (2004). A Mobility Response Model for Government, mGovLab, International University of Japan. 2005.

Loudon, K. and J. Loudon (1991). Management Information Systems: A Contemporary Perspective. New York, Macmillan.

Mallat, N., M. Rossi, et al. (2004). "Mobile Banking Services." Communications of the ACM 47(5): 42-46.

Merriam-Webster Outcome. 2005.

Nyberg, J. B. (1998). Statistics and the practice of adaptive management. Statistical Methods for Adaptive Management Studies. Victoria, BC., B.C. Ministry of Forests, Land Management Handbook. 42: 1-7.

Nyberg, J. B. (1999). An Introductory Guide to Adaptive Management for Project Leaders and Participants. 2005.

Rheingold, H. (2005). The Source of Innovation. Connected Workforce. S. Aspinall and A. J. Langer. London, Premuim Publishing.

Sekaran, U. (2003). Research Methods for Business: A Skill Building Approach, Southern Illinois University.

Solingen, R., van and E. Berghout (1999). The goal/question/metric method: a practical guide for quality improvement of software development. London; Chicago, McGraw-Hill.

Textually.org (2005). Interactive Vote on Town's Future. 2005.

The City of Norfolk VA (2005). Glossary/Index, Budget Office. 2005.

UN Expert Group (2003). Improving Public Sector Effectiveness. Dublin, Ireland, Department of Economic and Social Affairs, Division for Social Policy and Development - United Nations - New York.

Vedung, E. (2000). Public Policy and Programme Evaluation,. London, Transaction Publishers.

Willcocks, L. and H. Margetts (1994). "Risk Assessment and Information Systems." European Journal of Information Systems 3(2): 127-138.

Wohltorf, J. and S. Albayrak (2003). Decision Cockpit for Mobile Services. Berlin, Germany, DAI-Labor of the Technische Universitat.