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ECONOMIC VALUE OF E-GOVERNANCE: A CASE STUDY ON ONLINE HOLIDAY BUNGALOW RESERVATION SYSTEM OF DEPARTMENT OF WILDLIFE CONSERVATION

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ABSTRACT

"e-Government" is the use of information and communication technologies (ICTs) to improve the activities of public sector organizations expecting greater efficiency and effectiveness of public sector operations. However, in practice, e-Government projects are given a low priority by the decision makers though stated otherwise. Apparent reason for this behaviour is the higher private risk, high level of failures, higher project costs and the difficulty of recognising the benefits in quantitative terms in order to justify the investment.Estimation of the economic benefits or the social welfare of e-Government projects in quantitative terms is a vital requirement in order to eliminate the reluctance and the fear mindset of the management and rational justification of such projects.

Outcomes of e-Government projects often do not have apparent direct market values or their values could not be elicited through associated surrogate markets. In such a situation, only option is to move in to the world of contingent valuation. This study aimed at estimating the economic value of the e-Government solution proposed by the Department of Wildlife Conservation of Sri Lanka, aiming at better citizen services.

The derived demand functions for different options of the proposed e-Government solutions were following exponential and quadratic functional forms. The analysis shows that 1,059.45 Rupees of consumer surplus per person per use could be generated by the e-Government solutions and the economic value of the solution is 135 million Rupees annually. According to the results of the study, the willingness to pay is affected by the education level and not by factors such as income level. It is also found that, the Contingent Valuation Techniques, which are used in various other disciplines in estimating social welfare of the commodities in non-markets, could be effectively used in estimating the value of the social welfare of e-Government solutions in order to facilitate informed policy decisions.

KEY WORDS: e-Government, Contingent Valuation, Commodities in Non-markets

INTRODUCTION

E-Government is defined in many ways by many scholars and generally it can be defined as the application of information and communication technologies (ICTs) to enhance the performance of Government functions and services. More specifically, e-Government is "the use of digital technologies to transform Government operations in order to improve effectiveness, efficiency and service delivery (Lee and Oh, 2011). According to Lee and Oh (2011), most of the current definitions of e-Government focus on four basic elements *i.e.* (a) the use of ICTs, (b) the support of Government actions,(c) the improvement of Government relationships with citizens, and (d) the following of a strategy oriented to add value to the participants in the process.

United Nations (2003) defines e-Government as utilizing the Internet and World Wide Web for delivering e-Government information and services to citizens. World Bank defines e-Government as the use by Government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses and other arms of government. OECD (2001) however defines the term e-Government as use of new ICTs by governments as applied to the full range of Government functions.

E-Government saves customers' money in the form of faster, easier and more convenient service, better quality and reduced turnaround times, and in some cases a reduction in the direct cost for the service (NOIE 2003). There are also many social benefits valued by citizens including increased community skill and knowledge, and new business and work opportunities. Not all the benefits of e-Government are to the users. It can also deliver cost savings to businesses in the form of speedier transactions and lower staff costs (NOIE, 2003).Hence, increasing number of e-Government projects are being implemented in developing and transitional economies (Heeks, 2003). However, according to Heeks (2003), majority of these projects, which are hi-tech and glamorous, are failures. He found that 35% of e-Government projects are total failures, 50% are partial failures, and 15% are successes. The high level of failures, higher project costs and the difficulty of recognising the benefits in quantitative terms hinder justifying e-Government projects.Hence, they are often ear marked as low priority among other projects.

Sri Lanka has few success stories in the area of e-Government solutions. However, it is a fact that such projects were initiated with great difficulties and resistances in the early stages. Many organizations are reluctant to implement e-Government projects due to the fear of failures and difficulties faced in justifying the investment, as in many cases the benefits are intangible and indirect but cost are immediate, enormous and apparent. This study focuses on the need aroused in the Department of Wildlife Conservation in introducing an e-Government solution and attempt estimating the economic value (or the social welfare) of the project in quantitative terms in order to eliminate the reluctance and the fear mindset of the management and enable rational justification of the project.

The negative mind-set among the decision makers on implementing e-Government Projects make public sector reluctant in venturing into e-Government solutions despite the encouraging rules and regulations introduced by the top level policy makers. The services of e-Government projects are public in nature and the process of value determination is not effective and efficient within the market mechanism as public goods violate basic assumptions in market economics. Though economic benefits of such projects could be many times higher than the financial benefits discovered by the market mechanism, estimated true economic values of the e-Government projects are not readily available for decision makers. As a result, available scarce resources are often allocated to other priorities. This could be called

as "priority crises" of the e-Government projects. This is due to the lack of a proper approach in estimating the economic values of such projects. Hence "unavailability of a methodology to estimate the economic value of e-Government project in quantitative terms" is the research problem expected to be answered by this study.

Many years back, the Department of Wildlife Conservation automated its bungalow reservation system and introduced a system at park gates aiming at speedy service delivery with lesser usage of human resource. However, with the changing requirements of both customers and the officials, the need for a new e-Government solution which can provide more Government to Citizen (G2C) services and address many of the back officer issueswas felt. Department of Wildlife Conservation provides services such as export and import permit processing (Government to Business service (G2B)), filming permission in PAs (G2B), registering and renewal of tusks and elephants (G2C) *etc.*, in addition to the tourism services. Inclusion of those areas into the system is also a necessity. However, scope of this study is restricted only to the e-Government solution for tourism, provide solutions to wildlife holiday bungalow reservation procedure which is a G2C service. The study aims at testing anempirical model within this scope. However, the model could be tested and used on any e-Government project.

The general objective of the study was to estimate the economic value of the e-Government solution proposed by Department of Wildlife Conservation, which could be used quantitatively in justifying the project. The specific objectives of the study were to;

1. Evaluate the customer perception on proposed e-Government solution.
2. Identify the factors affecting the Willingness to Pay by customers for e-Government Solutions.
3. Evaluate the possibility of using fundamentals concepts of Contingency Valuation Methods (CVM) developed for non market commodities in estimating the economic value of e-Government projects.
4. Estimate the economic value of the proposed system for holiday bungalow reservation and day visitor entry in the department of wildlife conservation.

MATERIALS AND METHODS

Theoretical background

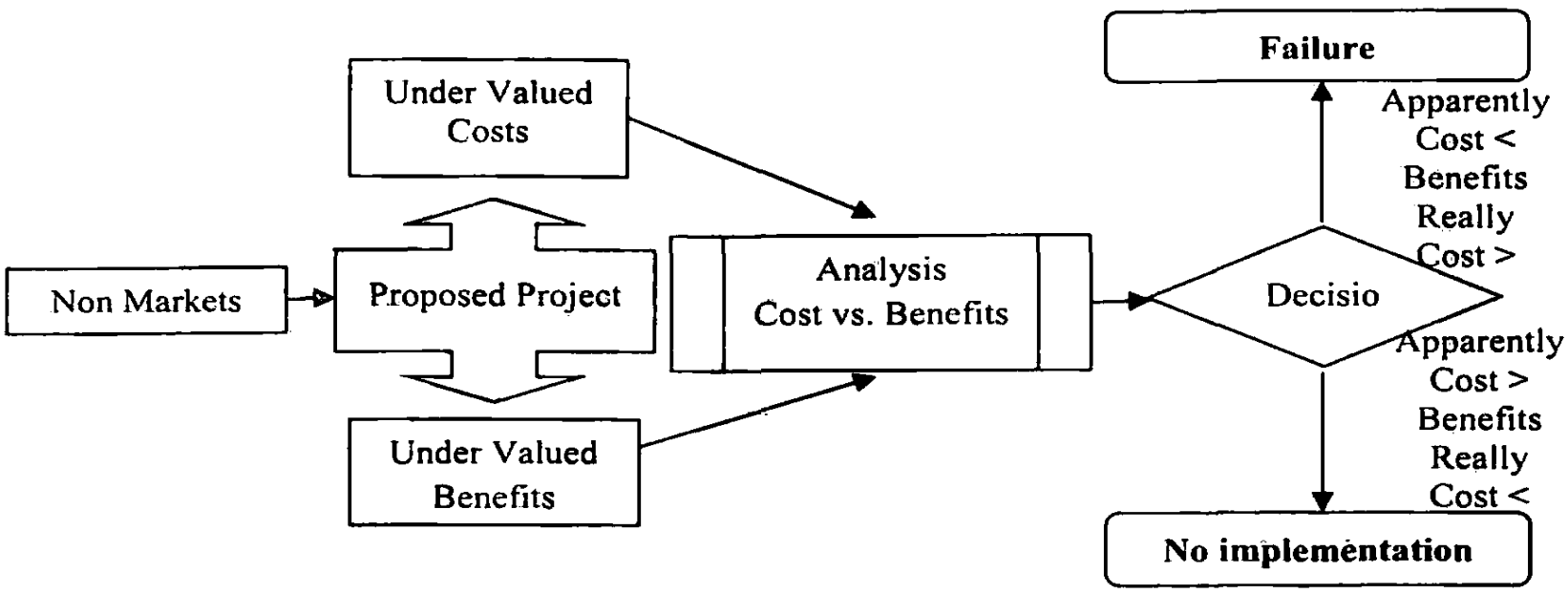
Service provided by e-Government solutions is public. Approaches in measuring the benefits of e-Government should focus on four aspects namely, agency benefits (business sector), consumer financial benefits (citizens), social benefits (economic) and contribution to broader e-Government objectives (governance). However, financial benefits are the only aspect often considered in project analysis.

Public goods (or services) are the goods which are non rival and non exclusive in nature. A good is non rival if, for any given level of production, the marginal cost of providing it to an additional consumer is zero (using a road by other pedestrian, costs nothing as the road is already built). A good is non exclusive if people cannot be excluded from consuming and hence it is difficult or impossible to charge people who consume it (when national defence is provided by a nation, every citizen is benefited and no one can be excluded from that benefit) (Pindyc and Rubinfeld 1989). The assumptions of the market mechanism do not satisfy when externalities and public goods are present. The externalities are considered in non-markets and economic value of such externalities is not automatically determined or could calculate in a straight forward manner due to this situation. As e-Government provided public services, the benefits of e-Government could not be measured in conventional financial valuation tools. Such benefits and costs are immeasurable as market mechanism fails in assigning proper values for those commodities. Accordingly, non-market valuation approaches may be a better candidate for valuation of such costs and benefits.

In economic valuation of goods in non-markets, hypothetical demand function is derived using various assumptions depending on the circumstance. Though the procedures are highly mathematical, it created a new way of looking at commodities which were considered as "invaluable" and "ignored" in the past to be "valued" and "included". This has enabled the estimation of economic value of commodities that are intangible, invaluable and operates in non-markets.Much of the theories are developed in environment related areas. However, the concept of non-market valuation could be effectively used in many other areas. Yasunga *et.al.*(2006) successfully used willingness to pay approach, which is contingent valuation method in estimating non market values in medical services. Hence, such techniques could also be tried in estimating non-market values of e-Government projects.

Conceptual framework

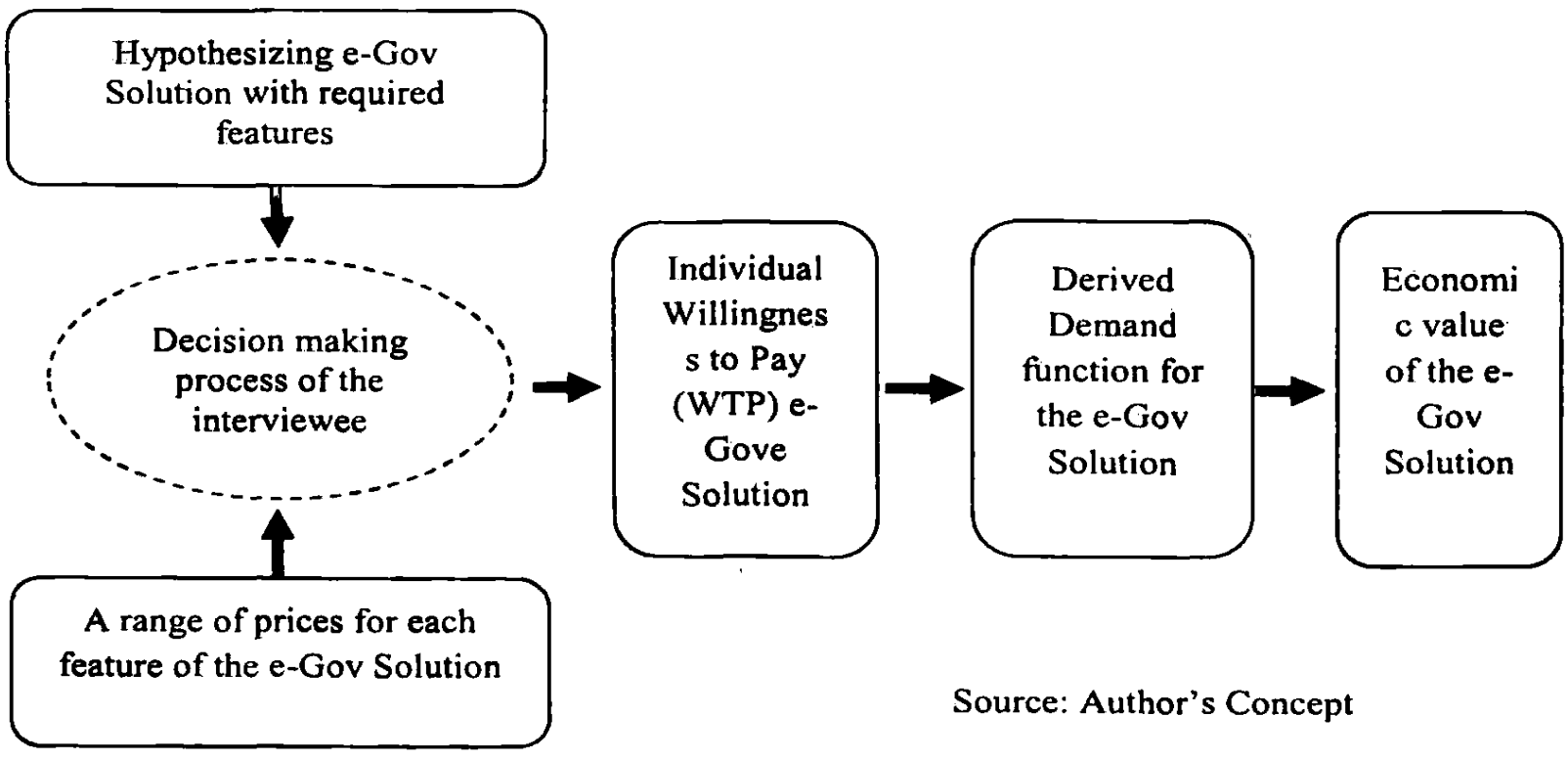
Where prices are lacking or are non-optimal, due to failures of markets or because prices are administratively determined, it leads to non-optimal signals being given to individuals on the value of such entities. Because decisions are made comparing the costs and benefits, non optimal values of costs and benefits will lead to poor decisions (Figure 1). As a result, there can be over-enthusiasm on e-Government and unexpected failures pave way to, complete avoidance or create a grave reluctance on implementation of e-Government projects.



Source: Author's Concept

Figure 1 : Impact of Commodities in Non-markets on Decision Making

Economic valuation attempts monetary quantification of the social valuation of resources, commodities and services based on individual preference. Such figures reflect the true values of the benefits of the proposed projects which can be effectively used in extended cost benefit analysis. In this study, features of the proposed e-Government project were presented to randomly selected clients and the willingness to pay for those features was recorded. The conceptual framework of the study in estimating the economic value of the e-Government solution is shown in Figure 2 below.



Source: Author's Concept

Figure 2 : Conceptual Framework of Valuation Process

The study was based on both primary and secondary data. The primary data was used to estimate the demand curve of the e-Government services and secondary data such as number of customers served monthly was used in estimating the economic value using the estimated demand curve. Secondary data were collected from internal records of the Department of Wildlife Conservation and the primary data was collected from randomly selected customers of the Department of Wildlife Conservation (DWC).

Wildlife holiday bungalow and campsite reservation starts on the first Monday of the month for the next calendar month. Usually, on the first Monday hundreds of people gather in the DWC head office and all the individuals present by 9.00 am are registered and a raffle is drawn at 10.00 a.m. The tokens are issued according to the results of the raffle draw. Though this procedure is time consuming and complex, customers prefer this solution, as it is transparent and fair. In selecting the sample for interview, list of customers who were issued tokens are treated as the sampling frame. The first Monday of the month is a peak reservation day and the rest of the days show a diminishing number of customers. Each day ten percent of the daily expected number of customers was randomly selected and interviewed. The total number of individuals interviewed during the study was 150. If the selected respondent refused to provide information another token number was selected randomly.

The data collected from customers were on following areas (which has an effect on the willingness to pay);

1. Preference on campsites or bungalows.
2. Frequency of previous stays in wildlife lodging facilities.
3. Education Background.
4. Nature of Occupation.
5. Exposure to environment based activity.
6. Gender and marital status.
7. Monthly income.
8. Opinion on the current procedure.
9. Willingness to pay for the features of the new system and the amount willing to pay.

The willingness to pay and the amount willing to pay was gathered using the "Payment Card with a Range of Price for the Good" and the proposed prices were selected using Delphi technique.

Assuming that Willingness to Pay as the dependent variable, a regression analysis was performed and correlation matrix was used to determine the factors that affected Willingness to Pay. Independent variables included gender, civil status, previous exposure to environment related activates, education level, occupation, and annual household income. Descriptive statistics such as mean and other general indicators such as percentages were also used. All statistical analyses were performed using statistics software SPSS ver.16.0.0 (SPSS Inc.).

RESULTS AND DISCUSSION

Description of the sample

The customers of the DWC who reserve wildlife bungalows are earning an average of Rupees 159,822.41 monthly. The minimum income is Rs 20,000.00, while the maximum is Rs 750,000.00. When considering the average income of a Sri Lankan citizen Rs. 437,412Per annum –Rs. 36,451 per month- (Department of Census and Statistics, 2011), it can be stated that the visitor of wildlife bungalows are the elite class of the country, who are having highest purchasing power.

The evaluation of the frequency of visitation to wildlife bungalows shows that, 26% of the total customers are visiting more than 4 times annually. Only 10% of the customers were rarely staying at wildlife bungalows. Greater proportion (39%) of customers were reserving wildlife bungalows 1 to 2 times annually. Twenty six percent (26%) of the customers visit 3 to 4 time and another twenty six percent (26%) visits more than 4 times annually. The annual weighted average visitation rate was 2.7 time per year per person. According to the results 61.29% of the customers were against the decentralization while 38.71% were for decentralization.

A greater proportion of customers were from business community (48.39%). Out of the total 25.81% of the customers were working in Government organizations. A percentage of 9.68 customers work in semi government and another 9.68% are consultants. Out of the total 6.45% customers are unemployed. It is also seen that the visitor to wildlife bungalows belongs to educated category and 38.71% of the customers were having degrees and 9.68% were having postgraduate level education. There were no visitors having education qualifications less than General Certificate of Education, Advance Level (GCE A/L). National Diploma in Technology and Advance Level qualified proportions were 12.90% and 38.71% respectively. A proportion of 67.74% customers were having nature related awareness. Some of them are wildlife enthusiasts and some are hobby photographers. The proportions of customers who were not having any nature related exposure were 32.26%. If the standard assumption of an8-hour working day and a 25-day month was used, average cost of one hour of the customer is 799.11 Rupees (1,917,868.97/12/25/8). In this context, spending the entire day on the reservation date results a cost of Rs.6,392.90 per customer in addition to bungalow reservation fee (average bungalow reservation fee is Rs.6,157.05 per day. See Table 1) which is less than that.

Table 1 : Cost of Reservation of Wildlife Bungalows

Fee Category (Rs. per day)	Number of Bungalows	Weighted Bungalow Fee
4,200.00	1	4,200.00
5,320.00	2	10,640.00
6,440.00	3	19,320.00
6,888.00	7	48,216.00
5,768.00	6	34,608.00
Total	19	116,984.00
Weighted Average Fee of a Wildlife Bungalow (Rs. per day)		6,157.05

According to the analysis, 87.1% of the respondents agreed to a price hike if the service quality is improved. However, 12.9% of the respondents did not agree to increase the price even with improved quality of service. When the responses on price hike was regressed against education level, type of occupation, exposure to nature and income level it is found that education contributed the greatest amount of the motivation to agree with the price hike (Table 2). According to the results, previous exposure to nature, type of occupation or income level has no significant impact on the decision.

Table 2: Asymptotic Correlation Matrix

		Threshold	Location			
		[Price Increase = 1]	Education	Occupation	Exposure to Nature	Income Level
[Price Increase = 1]		1.000	.737	.200	.420	-.037
Location	Education	.737	1.000	.265	-.129	-.411
	Occupation	.200	.265	1.000	-.022	-.697
	Exposure to Nature	.420	-.129	-.022	1.000	.036
	Income Level	-.037	-.411	-.697	.036	1.000

The willingness to pay for proposed features of the new solution is summarized in Table 3 below. According to the results, majority of the visitors are not willing to pay for decentralization. Therefore, the decentralization option was dropped from further evaluation.

Table 3 : Consumers' Willingness to Pay for Different Features

Feature	Willingness to Pay	
	Yes	No
Improve Head office	90%	10%
Online Facility	94%	6%
Decentralize Reservation	39%	61%
Improvement at Park Gate	77%	23%
e-Information Dissemination	87%	13%
Online Payment	90%	10%

The proposed features of the e-Government solution were explained to the interviewees and a range of prices selected using Delphi technique was presented. The total respondents who selected each price level were counted and the percentages were calculated for the sample (see Table 4.a and b). The prices against the percentages were then subjected to several models and the appropriate model was used to elicit the demand function.

Table 4 a: Percentage of Customers at Different Level of Willingness to Pay

Proposed Price (Rs.)	Improve Head office	Online Facility	Improvement at Park Gate	Online Payment
50	45%	32%	71%	42%
100	42%	29%	16%	45%
200	10%	13%	3%	10%
300	-	16%	3%	-
500	3%	10%	6%	3%

Table 4.b: Percentage of Customers at Different Level of Willingness to Pay.

Proposed Price (Rs.)	e-Information Dissemination
10	42%
25	23%
50	23%
75	-
100	13%

Using the percentage of customers who are willing to pay each proposed prices, different regression models were fitted in order to select the best functional form. According to the results, Exponential functional form is the best fit model for the demand function of improvements at the Head Office reservation procedure, information dissemination through electronic means, and online payment facilities. Logistic function is also giving equal level of fit as exponential form. However, the exponential functional form is used in integration due to its simplicity. Demand for online facility and improvement at park entrance for speedy clearance were better explained by the Quadratic functional form. However, the statics for estimated demand function for improvement at park entrance for speedy clearance is poor

compared to other function estimations. The R^2 is 0.779 and the function is not significant at 90% confidence interval. However, it is also used in further analysis. The results of the estimations are shown in Table 5.

Table 5 : e-Government Options and Estimated Demand Functions

e-Gov Option	Function Form	Coefficients		
		a	**b**	**c**
Improve Head office	$f(x) = ae^{bx}$ R^2 0.925, Sig 0.038, F 24.5	0.573	-0.006	
Online Facility	$f(x) = a + bx + cx^2$ R^2 0.917, Sig 0.083, F 10.99	0.431	-0.002	2.777×10^{-6}
Improvement at Park Gate	$f(x) = a + bx + cx^2$ R^2 0.779, Sig 0.221, F 3.519	0.802	-0.005	7.541×10^{-6}
e-Information Dissemination	$f(x) = ae^{bx}$ R^2 0.858, Sig 0.074, F 12.09	0.390	-0.001	
Online Payment	$f(x) = ae^{bx}$ R^2 0.916, Sig 0.043, F 21.84	0.569	-0.006	

The consumer surplus can be obtained by calculating the area under the demand curve and above the price. In this study, the quantities of the functions are in percentage of the populations. Therefore, in calculating the consumer surplus, the final values were multiplied by the total population of individuals who are reserving the bungalows (47,070 customers). The respondents' willingness to pay an additional fee was recorded for one visit. Hence, total willingness pay should be calculated for average frequency of visits to wildlife bungalows.

According to the results, (see Table 6) the total consumer surplus of the proposed e-Government solution is Rupees 1,059.45 per person per visit. Since the total population of wildlife enthusiasts who stay in wildlife bungalows was estimated at 47,070 individuals, the total welfare gain by them was 49,868,479.69 Rupees per visit. A consumer is staying in a wildlife bungalow 2.7 times per year on the average. Thus, the annual consumer surplus of the total consumer population is Rs.134, 644,895.17 per person per year. Since the consumer surplus gain is the measure for economic value of the proposed e-Government solution, the true value of the solution for consumers could be considered as 134 million per year.

Table 6: Estimation of Social Welfare Gain (Economic Value)

e-Gov Option	Consumer Surplus Per Person Per Visit (Rs.)
Improve Head office	95.50
Online Facility	390.00
Improvement at Park Gate	94.83
e-Information Dissemination	185.47
Online Payment	293.65
Consumer surplus for entire solution per person per visit	1,059.45
Consumer surplus of single visit for entire solution for entire population (47,070 individuals)	49,868,479.69
Total Annual Consumer Surplus (2.7 average annual visits)	134,644,895.17

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In the study, the contingent valuation technique was successfully used and the results obtained are realistic. Hence, it could be concluded that the Contingent Valuation Methods which were used in estimating non-market commodities in various other disciplines, can be successfully used in estimating the economic value of e-Government solutions. This will help in justifying such projects, as the benefits they generate to the economy could be evaluated in quantitative terms.

The customer's perception on the e-Government solutions are encouraging and it is mainly due to the higher education background of the customer. The customers are very accommodative and are willing to go forward with the new e-Government solutions.

It also can be concluded that the willingness to pay is mostly influenced by the education level. Staying in wildlife bungalows are generally considered as a luxury. Luxury commodities are highly elastic on the income level. But, surprisingly, the demand for bungalows has no significant relationship with the income level or occupation. It also does not significantly change with the exposure to the nature related activities. So, naming it as a luxury is questionable. However it could be considered as a demand created through higher order needs of the consumers arising due to the higher intellectual capacity resulted through the level of education. Such commodities (similar to the preference of classical music) are elastic to the income level and could be considers as an addiction or a habitual action.

The study was successful in estimating the economic value of the proposed web based ticketing system for bungalow reservation and the estimated value was 135 million Rupees per year. Finally, it could be conveniently stated that the results could be used

practically in analysing the benefits of the e-Government solutions and management decision could be made accordingly.

Recommendations

This study successfully applied the contingent valuation techniques in eliciting the social welfare improvement by the e-Government project. Hence, the Department of wildlife conservation can compare the value of the proposed system to the community against the costs of implementing the project. Accordingly any organization analysing the feasibility of e-Government projects could use the findings of this study and similar technique could be used in eliciting the economic values. Economic rate of return (ERR) calculated using economic values should be given a higher weight instead of Internal Rate of Return (IRR), Benefi Cost Ratio (B/C) or Net Present Value (NPV) calculated on financial terms during the analysis.

It is found that the education is the only factor affecting the willingness to pay on the e-Government solution. This also reflects the factors affecting positive customer taste on the service. Hence the Department of Wildlife Conservation should invest more in conservation education aiming at the general public as a marketing strategy. The common advertising approaches used by other hospitality service providers may not work on the wildlife bungalows. Since the customer care starts before sale of the good and extend after the end of consumption, the department should provide more facilities to gain knowledge on wildlife and nature to the visitors, prior to the reservation, during the stay and even after the stay.

When considering the willingness to pay and the opportunity cost of the time, which the consumers waste on reservation day, the department can increase the reservation fee in considerable amounts after implementing the system as it could reduce the opportunity cost of the consumer. This may increase the cash inflow and improve the financial benefits. Due to the practical limitations the consumers are concentrated only to Colombo and suburbs. The proposed system may enable inclusion of a broader customer base from all parts of the country, and the economic value may further increase as a result.

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