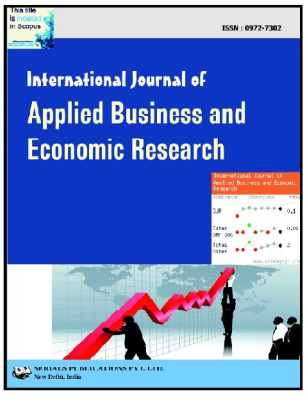

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Identifying Public Responses to Willingness to Pay Measures for Application in Water Services Research

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Abstract: This exploratory study attempts to identify public's responses towards willingness to pay (WTP) measures, namely, pay extra, contribution frame, and tax increase for application in water services research. The study involved twenty volunteers who were asked to fill in survey questionnaires focusing on the measures before they were requested to reflect on that experience with the researcher. The results from in-depth interview sessionsrevealed several findings, namely, opinions about the use of the measures and open- versus close-ended questions, as well as reflections on their ability to adequately respond to the tasks given.Reflections uncovered feelings of incompetence and uncertainty; insufficient knowledge on water services issueshadan effect on willingness decisions as some respondents felt the ringgit amount stated must parallel the seriousness of highlighted issues. Close-ended questions were easier mainly because they need to consider paying, contribute or taxed RM1, the amountidentified for evaluation. Of the three measures, contribution frame was favored more than the other two. These feedbacks have direct implication on how researchers should design WTP questions when members of the public is used as the respondents on specific issues concerning extra charges, contribution or tax for water services in Malaysia. It also shows the direction for the government and water operators on how they want to plan and strategize in coming up with suitable water pricing policies for the country.

Keywords: willingness to pay (WTP),paying extra, contribution frame, tax,User's Pay Policy, Water Service

1. INTRODUCTION

Malaysians in general believe that it is the government's responsibility to provide them with continuous, safe, quality, tasty, and affordable drinking water (AbdulWahid and Abustan, 2015). However, trying to fulfil this expectation is difficult as well as very costly. Malaysia's drinking water for instance adheres to both quality standards set byWorld Health Organization and Ministry of Health Malaysia and the sector always try to be managed in line with Malaysia's national water policy (DSAN) and legislations of water

related acts, namely the SuruhanjayaPerkhidmatan Air Negara Act (SPANA) and Water Services Industry Act (WSIA). Continuous repair, maintenance and upgrade of infrastructures, environmental and human capital issues as well as increased water demand have also added to the financial burden of the government and water operators. Despite the efforts, several local studies found mixed findings with some reporting the Malaysian public unhappy with water quality provided (Aini *et al.,* 2007; Kuna *et al.,* 2015) while other studies showing otherwise (Khattab and Abdul Wahid, 2015; Abdul Wahid and Chew, 2015); and that Malaysians have trust issues with water operators (Abdul Wahid *et al.,* 2016).

With increased costs, the recent water sector reform suggested the need to apply full cost recovery (FCR) for water operators so that they can recover all costs they have to bear for providing the public with water services. Roth's (2001) seven elements of FCR were considered comprehensive compared to other existing formulas (Abdul Wahid *et al.,* 2013) or on the suitability of the cost plus approach that Malaysia's water operators that are currently implementing (Cheong *et al.,* 2016).With intention to apply FCR, the public will be directly impacted as they have to pay for increased water tariff. Recent studies however found that people were unwilling to pay more for increased water tariff although they were told that the extra payment was meant for better services (Abdul Wahid and Chew, 2015, Abdul Wahid and Abustan, 2015). How the public perceivewater quality, health risk concern, continuous water supply and incomewere found to be determinants of their WTP (Abdul Wahid and Chew, 2015). Women compared to men were found to be more difficult to convince when it comes to the issue of safe, quality and willingness to pay for drinking water (Khattab and Abdul Wahid, 2015). These findings indicate that any decisions in regards to pricing policy (e.g. User's Pay Policy) must be made with care as it is a sensitive issue for the public.In particular, the public perceives water as a public good and their human right (Abdul Wahid and Abustan, 2015). Past studies have used various techniques to measure WTP, for instance, self-reporting and bidding game with open and closed ended questions/statements. With various techniques being applied in different studies, the question on whether they serve as valid and reliable measures of WTP arises (O'Brien &Viramontes, 2009). More importantly, whether respondents that respond to the specific measures were able to comprehend the decision task and for them to respond to the tasks as per instructed. The answer to this question is important in the case of water services in Malaysia as the outcome may have repercussion to how much the public is WTP for services they consumed. In line with this need, this studyhad chosenthree types of self-reported WTP measures that are popularly used in the literature, namely, pay extra, contribution frame and tax for the public to respond to and examined the effect the different measures had on the public; particularly in regards to the amount of ringgit decisions they were asked to pay, contribute or taxed based on water services related issues.

2. WTP

In general, WTP refers to the popular and normally applied method by researchers to help estimate the hypothetical amount of willingness the public want to contribute to a cause;normally by estimating on the hypothetical monetary value for specific programs or public policiesof certain social groups (Li *et al.*, 2014; Liebe *et al.*, 2011; Quevedo *et al.*, 2009; Dixit *et al.*, 2014; Ajzen *et al.*, 2000).In water services industry, the ability to estimate public's WTP is important particularly in situation where User's Pay Policy is intended to be used. The estimation will have direct implication to all stakeholders involved. Literature on water services studies found increased public's WTP for water services consumed when promised better quality of water,

namely, organoleptic characters, continuous water supply, less water pollution or less health risk (Doria *et al.*, 2009; Kuna *et al.*, 2015; Abdul Wahid and Abustan, 2015; Khattab and Abdul Wahid, 2015); some studies even identified the amount or percentage of money public'sWTPfor the cause (Abdul Wahid *et al.*, 2015; Kuna *et al.*, 2015; Li *et al.*, 2014).

Various measures of WTP are available in the literature to analyze thecost-benefit of programs or activities so that policy makers can decide on alternative solutions for the public involved in the program like water services. By applying gap analysis (to get the value difference between the program's future benefit flows and cost flows), cost-benefit analysis researcherswill be able to calculate WTP estimates for net social benefit of a program (Quevedo *et al.*, 2009)and suggest for program's recommendations accordingly to match the sectors available within the economy and monetary value for the program. Researchers can opt to model the cost-benefits analysis based on human capital approach (this is where the values of population health or quality of life gains and losses will be computed in terms of production gains and losses; and that the proxy will be on discounted future earnings streams for individuals in and out of employment due to their health status(O'Brien &Viramontes, 2009) ormodelled usingrevealed preferences approach or preferences using WTP (Quevedo *et al.*, 2009). In this paper however, the focus will be on the last suggested approach.

In general, WTP involves a survey method whereby respondents are presented with hypothetical scenario about a certain intervention or specific program that researchers intend to evaluate. Based on a real market for a specific program or benefit, respondents are asked to indicate the maximum amount they are willing to pay for the service in question (Blumenschein, Johannesson, Yokoyama & Freeman, 2001).This type of measurement is called contingent valuation method and in such studies, the intent was to try and decide on the worth of something that is not on the market, e.g. new technology in water abstraction that can help improve water quality services; the true value of the new technology is estimated by means of collective financing. A percentage or certain amount of respondent's income is sometimes used as the reference that respondents would be willing to sacrifice or contribute for the cause or service.

Depending upon how WTP is measured, researchers will be able to provide a recommended price or a selection of prices to explaininvestigated group's WTP. For instance, basic economic assessment models normally measure WTP through variables related to use of good and income (focus is on monetary values) only while other models like the Schwartz-Norman Activation Theory emphasizedon individual's psychological and social norm activation (focus is on altruistic behaviors) to explain WTP instead.Recently however,competing theories have been used to develop WTP models; here many theories werecombined in one model and investigated together; the models are known as competing theories model (Guagnano *et al.*, 2016).While the attempts are noble, still, the main issue in WTP measure lies in the 'how' aspect as this affects the validity and reliability of the measures. For example, how questionsor items on WTP are posed to respondents may influence the way how the respondents would respond. In addition, what information and how much of related information needed to be provided for respondents so that they can comprehend the issue they were asked to evaluate and respond accordingly to the request. The literature recorded views that individuals who were WTP for higher prices of a public good were actually displaying their altruistic behaviour as the extra money paid, or the amount of money contributed to a fund, or the sum they agreed to be taxed on were meant to provide benefits for the public. Kahneman and Knetsch (1992) conceptualized this altruistic act as the "purchase of moral satisfaction"as individuals place social concern within their intrapsychic decision process.

3. METHODOLOGY

To identify how members of the public responded to different self-reported WTP measures applied in water services research,this study applied a mixed-method approach.Twenty water users who volunteered for the studywere invited to participate in a survey (10 minutes) evaluating the three selected WTP measures, namely, paying extra, contribution frame, and tax increase first (here, respondents were asked to respond to hypothetical WTP water services scenarios) before being interviewed (20-30 minutes per in-depth interview session) and asked to reflect on the measures and WTP decisions they made earlier in the survey. Their feedbackswere then descriptively analysed and findings reported here. The feedbacks should help the researcher to conclude on the suitability and adequacy of the different WTP measures for use in water services research in Malaysia.

The survey applying the self-reported measure technique depictedthe creation of three types of scenarios with two items each to represent the different scenarios (in total six self-reported measures).Guagnano, Dietz and Stern's (1994) measures were adapted to matchscenarios experienced in the water services industry.This is because although Guagnano *et al.* studied a public good, their focus was on conservation of rain forest, not water services like in this study.The three scenarios, namely, pay extra on water bill (1 & 2), contributionto a special fund (3 & 4) and tax pay increase (5 & 6) also required the respondents to respond both freely and with choice as they were designed to be open-ended and close-ended unlike Guagnano *et al.* that applied only open-ended responses. All open ended questions to the scenarios were labelled as 1a through to 6a while close-ended ones were labelled 1b through to 6b. The close-ended responses were added as the intent of this study is to find out whether close-ended questions may affect respondents to respond differently than to the open-ended ones. As such, the amount of RM1 or more was identified to the response suggested for the extra pay on the water bill, contribution to a special fund or the tax increase for the same scenarios in the survey. The amount RM1 was selected as Malaysians on average pay around RM0.97/litre^3 of water (Ching, 2012). RBF technology was also reported by Wan Ahmad (2012) to cost less than RM1 (capital cost is approximated at RM0.94; operational cost at RM0.1624) much cheaper if compared to ground water and surface water (RM2.65 and RM2.73 for capital costs; RM0.2184 and RM0.2933 for operational costs respectively).Loomis (1990) reported that open-ended WTP methods produce equally reliable resultsas other WTP studies that opted for a dichotomous-choice assessment technique.

In this study, the first two items (1 & 2) depicting the pay extra water bill scenario were designed to emphasize on river bank filtration (RBF), the new technology identified for water abstraction with high potential for the government to invest on. The participants were asked to assess the following two scenario items given and decided on the extra amount of ringgit on their water bill that they are WTP so that investment on RBF can be made:

1. River bank filtration (RBF) is believed to be the new technology and main contributing factors to abstracting cleaner, safer and quality water. Studies have found that it is able to eradicate E-Coli bacteria normally found in water that is abstracted for drinking purposes. Assuming that this RBF technology works,

   (a) Indicate how much extra would you be WTP on your water bill so that an investment on the technology to achieve cleaner, safer and quality drinking water can be made? Response: I would be WTP an extra RM_____for this cause.

(b) Would you be WTP an extra RM1 or more on your water bill so that an investment on the technology to achieve cleaner, safer and quality drinking water can be made? Response: Yes / No.

2. An investment on a new water treatment technology that with the ability to produce cleaner, safer, and quality tap water for your home costs around RM1.20 per m^3.

   (a) Indicate how much extra would you be WTP to help invest in the new water treatment technology?Response: I am willing to pay an extra RM_____for this cause.

   (b) Would you be WTP an extra RM1 or more to help invest the new water treatment technology for stringent tests to have cleaner, safer, and quality water? Response: Yes / No.

The next two scenario-items (3 and 4) imposed a contribution frame by asking respondent's willingness to contribute toan environmental fund that would help to solve environmental problem related to water intake locations. They first have to decide freely on how much they want to contribute (3a) before decidingagain on their willingness to contribute RM1 or more as per the suggested amount for the fund (3b):

3. Scientists are becoming increasingly concerned about the cleanliness of water resources at intake locations due to activities like heavy tree cutting in the water reserves areas. To preserve these water intake areas, the government has the intention to establish a special, one-time fund on which the public is asked to contribute to.

   (a) In theevent that the government's intention to establish the special fund to preserve these water intake areas comes true, can you indicate how much would you be willing to contribute to a one-time fund of this type?Response: I am willing to contribute RM___ to this special fund.

   (b) In the event that the government's intentionto establish the special fund to preserve these water intake areas comes true, would you be willing to contribute RM1 or more to a one-time fund of this type? Yes/No.

4. Some people are concerned that increasing amounts of toxic chemicals are making their way into our drinking water.There have been past incidents recorded on the issue.

   (a) In the event that one of these chemicals was found in Malaysia's water supply and no responsible party can be identified, can you indicate how much would you be willing to contribute to a one-time fund to solve this problem?Response: I am willing to contribute RM___ for this special fund.

   (b) In the event that one of these chemicals was found in Malaysia's water supply and no responsible party can be identified, would you be willing to contribute to RM1 or more to a one-time fund to solve this problem? Response: Yes / No.

The last two scenario items presented in the survey (5 and 6) were identical to scenario-items 3 and 4 except that they focused on the tax increase instead which would force respondents with an explicitly non-contribution decision frame to consider:

5. Scientists are becoming increasingly concerned about the cleanliness of water resources at intake locations due to activities like heavy tree cutting in the water reserves areas. The conservation of these areas costly and increase of public's tax is suggested to be the solution.

(a) If the government intends to increase tax paid by the public, what do you think would be a reasonable ringgit amount for your taxes to increase to solve the problem?Response: I think RM_____ would be the reasonable amount to pay above my current tax.

(b) If the government intends to increase tax paid by the public, would you be willing to pay RM1 or more tax as the reasonable ringgit amount for your taxes to increase to solve the problem? Response: Yes / No.

6. Some people are concerned that increasing amounts of toxic chemicals are making their way into our drinking water. There have been past incidents recorded on the issue.

(a) In the event that one of these chemicals was found in Malaysia's water supply and no responsible party can be identified, what do you think would be a reasonable ringgit amount for your taxes to increase to solve the problem? Response: I am willing to increase my tax by RM___ above my current tax to solve the problem.

(b) In the event that one of these chemicals was found in Malaysia's water supply and no responsible party can be identified, would you be willing to pay RM1 or more above your current tax to solve this problem? Response: Yes / No.

4. RESULTS

Profile of respondents show that the majority of the group to be female (12 or 60%), those who are married (12 or 60%), those with Bachelor degree (10 or 50%), those aged between 31-40 years old (10 or 50%), those with employment (17 or 85%), those with household size between 2 to 6 people (11 or 55%) and live in urban location (16 or 80%).

In general, the respondents' reflections revealed the incompetence and uncertainty they felt when they responded to the self-reported WTP scenarios. Majority claimed not having enough knowledge on water services issues which affected their decisions in regards to the willing amount they would pay extra for on their water bill, to contribute to the special fund or to be taxed. As such, they were uncertain on whether the amount decided was parallel and matched the seriousness of the highlighted issues. For instance, three respondents felt that they did not have the ability and level of knowledge on the issues they have to evaluate on particularly when they were required to state an amount they were WTP on open-ended questions;i.e. "I don't know much about the [water services] issues. I am just a member of the public (user) …" [IR 18]; "… the questions were difficult … to think [on] how much contribution to make when I know nothing about technology and investment?" [IR 6]; and "I just simply answer … I don't know if they were correct or not … did not know water issues are complex" [IR 5].

Six respondents brought up the issues on the lack of and accuracy of information on the scenarios presented to them to decide on WTP values. For instance, "Difficult for me to decide on the amount to contribute when I don't have a detailed picture of the problem in the scenarios …" [IR20] and "This information [referring to scenario item 2] is still general to me. Is it accurate?" [IR 13] were examples of responses given.

Three respondents brought up the issue of open ended answers they had to endure; e.g. "It is difficult to decide on the amount …when it is designed like this (referring to open ended column they have to fill

up)" [IR 7] and "I filled up the column with any amount that I can think of; I am afraid that the amount I wrote were not representative of or help solve the problems posed" [IR 9].

Of the three types of self-reported measures, contribution frame seemed to be favoured more than the other two.Three respondents who favoured contribution frame justified their choice based on the phrase willingness to contribute that to them indicated the act to give with sincerity [IR 10, IR 11] compared to pay extra or tax that were perceived as something that is forced [IR 5]. However, one respondent viewed that tax would be best applied compared to paying extra or contribution to a fund. He seemed to have knowledge and ideas on the task he had to do: "I think tax is the best option here. It is fixed. The government only need to come up with the amount they want to tax the public with. … Having to pay only RM1 more on the tax [I currently paid] … is very fair … considerate considering the costs the government has to endure" [IR 12].

These feedbacks have direct implication on how researchers should design WTP questions when members of the public is used as the respondents on specific issues concerning extra charges, contribution or tax for water services in Malaysia. It seems that respondents must be able to comprehend on the raised issues although they were hypothetical in nature. Without enough knowledge, the public may ended up responding 'blindly'as long as they indicated any amount required or agreed to the suggested amount in the WTP measures. This means that more and accurate information may need to be added when designing the item scenarios. Researchers can still opt for any of the three self-reported measures to evaluate public's WTP. These issues are important particularly as the reliability and validity of results can affect the direction of the estimation plans and strategies made by government on water pricing policies for the country.

5. CONCLUSION

The findings of the exploratory study lead to the conclusion that researchers need to have the ability to find the right technique to measure public's WTP to ensure the measures are valid and reliable. Paying extra, contribution and tax have the potential to be used for measuring WTP for water services. However, respondents need to have certain knowledge before they can decide on options of WTP extra, contribution to a fund or be taxed. The study findings indicate that without proper knowledge, the public cannot confidently decide on their participation and WTP contribution to solve the problem(s) at hand. This can result in inaccurate amount they would suggest as their WTP that will impact on how the government's public policy on water tariff that suits both the water services industry and public needs. Providing more detailed and accurate information about the true picture of the water services industry situation may help the public to understand the issues better; and that they will use the information when evaluating WTP and deciding on the amount they consider appropriate to help such cause.

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