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Consumer Satisfaction, Preferences and Acceptance Regarding Drinking Water Services

An overview of literature findings
and assessment methods

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Samenvatting

Nederlandse samenvatting van het rapport *Consumer satisfaction, preferences and acceptance regarding drinking water services – An overview of literature findings and assessment methods*.

"Consumententevredenheid, voorkeuren en acceptatie met betrekking tot drinkwaterdiensten – Bepalingsmethoden en uitkomsten van klantonderzoek"

1. Inleiding

Drinkwater is in veel opzichten een uniek product en verschilt op een aantal essentiële punten van andere consumentengoederen en -diensten. Om te beginnen is intussen breed aanvaard dat drinkwater een mensenrecht is, waardoor het als 'product'een bijzondere status heeft. Verder is veilig en voldoende drinkwater een absolute vereiste voor een stabiele en gezonde samenleving. De fundamentele afhankelijkheid van schoon drinkwater motiveert Europese overheden om zich sterk in te spannen voor continuïteit en kwaliteit van de levering van schoon drinkwater aan hun burgers. Dit is tevens noodzakelijk omdat de meeste Europeanen geen keus hebben in kraanwaterleverancier. Zelfs in Groot-Brittannië, waar het drinkwater systeem het meest geprivatiseerd is, kunnen consumenten niet overstappen op een andere leverancier wanneer zij ontevreden zijn over het ontvangen water of de geleverde diensten. De Europese consument ziet de continue levering van goed water, net als die van andere nutsvoorzieningen, als vanzelfsprekendheid, totdat er leveringsonderbrekingen of andere incidenten plaatsvinden, of er sprake is van prijsverhogingen. Echter, de consumptie van drinkwater heeft, veel meer dan gas en elektriciteit, grote invloed op de persoonlijke gezondheid van de consument. De genoemde karakteristieken zorgen ervoor dat de theorieën die ten grondslag liggen aan technieken en methoden voor consumentenonderzoek niet zonder meer van toepassing zijn op drinkwater (dienstverlening).

De meeste West-Europese landen hebben in de afgelopen anderhalve eeuw een solide drinkwatersysteem opgebouwd, dat betrouwbare levering van kwalitatief goed drinkwater aan de gehele bevolking mogelijk maakt. In de loop der jaren zijn de systemen technisch geoptimaliseerd, waardoor er nu ruimte is voor het optimaliseren van efficiëntie en klantgerichtheid. De waterbedrijven voeren hiertoe consumentenonderzoeken uit, meestal gericht op het bepalen van de klanttevredenheid op bepaalde aspecten van dienstverlening, bijvoorbeeld klantenservice. Dergelijk onderzoek heeft vaak betrekking op reeds ontvangen diensten. Om werkelijk klantgericht te zijn, is het echter van belang om vooruit te zien wat de klant wenst, eist en accepteert. Hiervoor zijn methoden en technieken beschikbaar die toepasbaar zijn voor drinkwaterbedrijven.

In het rapport worden deze technieken en hun resultaten besproken en wordt een onderzoeksmethode aanbevolen die rekening houdt met de specifieke

karakteristieken van de drinkwater sector. Daartoe is een inventarisatie gemaakt van internationaal consumentenonderzoek in de drinkwatersector, inclusief Nederland en Vlaanderen Er is daarbij gelet op de gebruikte methoden en theoretische onderbouwing van de onderzoeken. Daarnaast is gekeken is welke zaken reeds onderzocht zijn over tevredenheid, voorkeuren en acceptatie van de particuliere drinkwaterconsument.

Dit onderzoek is uitgevoerd in het kader van het gezamenlijke bedrijfstak onderzoek (BTO) van Nederlandse, Vlaamse, Arubaanse en Antilliaanse waterbedrijven en het Europese onderzoeksproject TECHNEAU.

2. Reikwijdte van het onderzoek en definities

Dit onderzoek richt zich voornamelijk op de voorkeuren (of wensen) van particuliere drinkwaterconsumenten. Het doel is enerzijds te achterhalen wat consumenten wensen, wat zij acceptabel vinden (en wat niet) en hoe dit hun tevredenheid beïnvloedt. Anderzijds is gekeken welke technieken en methoden gebruikt worden om tevredenheid, wensen en acceptatie te bepalen, en welke hiervoor toepasbaar zijn voor drinkwaterconsumenten.

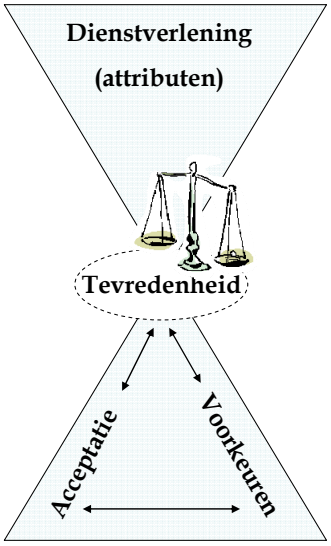
Zoals bij het meeste consumentenonderzoek en sociale wetenschappen in het algemeen het geval is, ontbreekt duidelijkheid en eenduidigheid in gebruikte terminologie en definities. De belangrijkste concepten en definities in dit rapport zijn:

- Tevredenheid: *het voldoen aan een behoefte of wens op het gebied van een bepaald attribuut (aspect van product of dienstverlening)*
- Voorkeur: *de meest gewenste optie van een aantal alternatieven*
- Willingness To Pay (WTP): *betalingsbereidheid, bedrag dat iemand bereid is te betalen voor een bepaald serviceniveau. WTP is tevens de naam voor economische waarderingsmethoden waarbij respondenten gevraagd wordt naar hun (relatieve) betalingsbereidheid voor een bepaald alternatief. Op basis van de principes van economische welvaartstheorie kan dan achterhaald worden welke alternatieven de voorkeur hebben van consumenten*
- Acceptatie: *bereidheid te tolereren*

Uit de literatuur blijkt dat er (nog) geen algemeen geaccepteerd model bestaat waaruit de relaties tussen tevredenheid, voorkeuren en acceptatie blijken. Klantwensen, acceptatie en tevredenheid zijn concepten die met elkaar in verband staan, maar de literatuur brengt geen duidelijkheid in de wijze waarop ze met elkaar zijn verbonden. In dit rapport is gebruik gemaakt van een basaal conceptueel model dat gebaseerd is op de bevindingen van het literatuuronderzoek (SV Figuur 1).

Consumentenvoorkeuren en –acceptatie zijn met elkaar verbonden; in het spectrum van wat consumenten wensen, staan voorkeuren bovenaan, terwijl acceptatie gezien kan worden als de ondergrens. (On)tevredenheid is het resultaat van een (impliciete) afweging van een ontvangen product of dienst tegen de wensen en behoeften van de consument. Wanneer geleverde producten of diensten door de consument geëvalueerd worden onder het niveau van acceptatie, zal ontevredenheid het gevolg zijn. Hoe meer het

aangeboden product of dienst in overeenstemming is met de behoeften / wensen van de consument, hoe groter de tevredenheid zal zijn. Tevredenheid, voorkeuren en acceptatie zijn dus aan elkaar gerelateerd, waarbij voorkeuren en acceptatie zich achtereenvolgens op één (beoordelings-)lijn lijken te bevinden. Het is echter niet zo dat acceptatie automatisch leidt tot tevredenheid.



SV Figuur 1 Schematische weergave van de relatie tussen de concepten acceptatie, voorkeuren en tevredenheid

3. Bepalen van consumententevredenheid, -voorkeuren en -acceptatie met betrekking tot drinkwaterdiensten

Bij het bepalen van consumententevredenheid, -voorkeuren en –acceptatie voor drinkwaterdiensten, is het van belang stil te staan bij de karakteristieke eigenschappen van drinkwaterlevering. Doordat het een monopolie betreft, geldt dat er zeker geen sprake is van een perfecte marktsituatie. De veronderstellingen die ten grondslag liggen aan veel marktonderzoekstechnieken gaan hier wel vanuit. Daarbij komt dat water een 'low-involvement' en 'low-interest' product is. Door het basale karakter van water is het product waar mensen weinig interesse in hebben. Het houdt mensen niet bezig, ze hebben er doorgaans weinig gevoel bij en geen mening over, tenzij de prijs verhoogd wordt, of er problemen ontstaan. Direct op de man af te vragen wat mensen zouden wensen met betrekking tot een product waar ze eigenlijk nooit over nadenken, kan een vertekend beeld opleveren. Het bepalen van consumentenwensen vereist derhalve verfijnde onderzoeksmethoden om te onthullen wat consumenten willen zonder daarbij hun gedachten te sturen, of hun mening te beïnvloeden. In het onderzoek is gekeken naar verschillende methoden en technieken om op betrouwbare en valide wijze te achterhalen welke aspecten van dienstverlening consumenten het meest waarderen en welke minder. Als bekend is welke aspecten van dienstverlening (attributen) consumenten

belangrijk vinden en hoe ze die waarderen, kunnen waterbedrijven daarop sturen om de klanttevredenheid te vergroten of de efficiëntie te verbeteren.

SV Tabel 1 geeft een overzicht van de in het rapport besproken methoden en technieken om consumententevredenheid, -voorkeuren en –acceptatie te bepalen.

SV Tabel 1 Overzicht van het resultaat van de inventarisatie van onderzoekstechnieken voor consumentenonderzoek in de drinkwater sector

Consumenten…	Onderzoekstechniek
Tevredenheid	Enquête / interview
	Strategic Improvement Method
	Subjective Social Indicator
	Gap analysis (a.o. SERVQUAL)
Wensen / voorkeuren	Willingness To Pay (betalingsbereidheid) • Contingent Valuation • Choice Modeling
	Unity-sum-gain technique
Acceptatie	Enquête / interview
	Willingness To Accept (acceptatiebereidheid)
	Latitude of Acceptance (vrijheidsgraden van acceptatie)

Tevredenheid
In Europa beperkt het consumentenonderzoek zich veelal tot (variaties van) tevredenheidonderzoek, waarbij consumenten met behulp van enquêtes of interviews gevraagd wordt naar hun waardering van bepaalde aspecten van reeds ontvangen dienstverlening. Theoretische onderbouwing of verantwoording ontbreekt daarbij meestal. Bij tevredenheidsonderzoek dient erop gelet te worden dat de attributen die door de respondenten worden beoordeeld ook de attributen zijn die maatgevend zijn voor de tevredenheid van de consument. Door voorafgaand aan het tevredenheidsonderzoek discussiegroepen met consumenten te organiseren, kunnen de voor de consument belangrijke zaken worden achterhaald.

Voorkeuren
Voorkeuren zijn de afwegingen die de consument maakt tussen kosten en baten. Deze afweging uit zich in wat de persoon bereid is op te geven (kosten) om iets te verkrijgen (baten). Voorkeuren hebben niet alleen betrekking op *wat* mensen willen (keuzes tussen attributen), maar ook welke *prioriteit* ze hier aan toekennen.

Door de specifieke aard van drinkwater en de relatief recente interesse in onderzoek naar consumenten voorkeuren, is er (nog) niet één algemeen geaccepteerde theorie op dit gebied. Willingness To Pay (WTP) onderzoeken, gebaseerd op de economische welvaartstheorie, blijken de meest gebruikte onderzoekstechnieken. In WTP-studies wordt de betalingsbereidheid gemeten door respondenten te vragen hun voorkeur aan te geven voor

combinaties van product- en service attributen. Door de keuzes die de ondervraagden voorgelegd krijgen op slimme wijze samen te stellen, kunnen hun relatieve voorkeuren voor product- en serviceattributen worden achterhaald. Echter, de betalingsbereidheid voor bepaalde verbeteringen in producten of dienstverlening blijkt vaak in werkelijkheid lager te zijn dan uit WTP studies af te leiden is. Het is aannemelijk dat mensen hun keuzes voor bepaalde combinaties van product- en service attributen niet alleen maken op basis van monetaire afwegingen, maar bijvoorbeeld ook ethische of culturele. In de praktijk blijkt dat de techniek beter gebruikt kan worden om de relatieve voorkeuren van mensen te achterhalen dan om werkelijk te verwachten inkomsten te berekenen. Omdat drinkwater een aantal kenmerken heeft die niet overeenkomen met de veronderstellingen die ten grondslag liggen aan WTP-technieken, is het van belang de context waarin de consumenten hun afwegingen maken te onderzoeken. Het is waarschijnlijk dat sociaal-culturele factoren waardeoordelen van mensen beïnvloeden.

Acceptatie
Het vaststellen van wat mensen bereid zijn te tolereren van hun drinkwaterbedrijf kan van belang zijn om het minimaal toelaatbare niveau van dienstverlening te bepalen. Wat mensen bereid zijn te accepteren geeft de speelruimte aan die waterbedrijven hebben. De meest gebruikte manier om acceptatie te bepalen is Willingness To Accept (WTA), gebaseerd op dezelfde principes en gebruik makend van dezelfde technieken als WTP.

Voorgestelde methode
Om meer inzicht te krijgen in klantwensen, acceptatie en tevredenheid wordt op basis van de literatuurstudie een methode voorgesteld om deze zaken te onderzoeken in de drinkwater sector. De voorgestelde methode is gebaseerd op onderzoeksresultaten van CSIRO, Australië. Zij hebben de componenten reeds getest en geschikt bevonden voor onderzoek naar klantvoorkeuren voor dienstverlening in de drinkwatersector.

De voorgestelde methode om klantwensen te achterhalen, bestaat uit een aantal stappen:
1. Focus groepen: wat vindt de consument belangrijk ten aanzien van drinkwaterlevering?
2. Subjective Social Indicator: welk serviceniveau heeft de voorkeur van de consument?
3. Lattitude of Acceptance: welke problemen/aanpassingen vindt de consument nog acceptabel?
4. Choice Modelling: welke voorkeuren heeft de consument?

Om de uitkomsten van het consumentenonderzoek goed te kunnen interpreteren is het van belang om de stappen goed in te bedden in specifieke omstandigheden waarin klanten verkeren . Er wordt daarom aangeraden voorafgaand aan deze stappen kwalitatief onderzoek te verrichten naar de karakteristieken van de drinkwatersector, met name op het gebied van consumenten.

5. Uitkomsten van klantonderzoek

5.1 Tevredenheid

In het algemeen kan wel gezegd worden, dat Europeanen (met uitzondering van Estland, Letland en Litouwen) tevreden zijn over de kwaliteit van hun waterlevering. Tevredenheid en risico-perceptie zijn nauw met elkaar verbonden. Risico-perceptie is een resultante van objectieve informatie, sociale, culturele en psychologische factoren. Mensen beoordelen hun drinkwater op basis van kleur, troebelheid, smaak en geur, waarbij hun oordeel sterk afhankelijk is van wat zij gewend zijn. Smaakt of ruikt het water naar chloor, dan is dit een belangrijke veroorzaker van ontevredenheid. Ook communicatie blijkt grote invloed te hebben op tevredenheid. Na kwaliteit, staat ook betrouwbaarheid van de levering hoog in de prioriteitenlijst. De prijs van drinkwater wordt door de meeste Europeanen als redelijk ervaren.

5.2 Voorkeuren

5.2.1 Algemene bevindingen met betrekking tot voorkeuren

De meeste studies tonen aan dat schoon en veilig drinkwater de hoogste prioriteit heeft bij consumenten. Van waterbedrijven wordt verwacht dat zij schoon drinkwater leveren tegen redelijke kosten. Het niveau van de drinkwatervoorziening en de kosten moeten in principe gelijk zijn voor alle klanten en mogen niet afhankelijk zijn van het gebied waar geleverd wordt. Over het algemeen worden watermeters gezien als een efficiënte manier van kosten berekenen en stimulans voor waterbesparing. Watermeters maken consumenten bewuster van hun verbruik. Met betrekking tot kostenberekening wensen consumenten een goede balans tussen de prijs die zij betalen en de kwaliteit van dienstverlening die ze ervoor terugkrijgen (niet te veel winst voor waterbedrijven).

Hoewel het idee dat waterbedrijven consumenten moeten informeren over hun bedrijfsvoering wordt gesteund door consumentenorganisaties is er weinig duidelijkheid over hoe de consument hierover denkt. Het is niet bekend welke informatie de consument wenst en of de parameters die de sector relevant acht, dat ook zijn in de ogen van de consument. Eén studie concludeerde dat het vooral belangrijk is dat de geïnteresseerde consument op het gewenste moment de juiste informatie snel kan verkrijgen in een toegankelijke vorm.

5.2.2 Klachten als alternatieve indicator voor voorkeuren

De meeste waterbedrijven erkennen dat klachten een belangrijke indicator zijn voor ontevredenheid en monitoren ze als zodanig. Hierbij dient te worden opgemerkt dat klachten een onnauwkeurige maat zijn voor ontevredenheid, omdat niet alle ontevreden consumenten klagen. De waterbedrijven in Europa krijgen relatief weinig klachten, een groot deel van de klagers is echter wel ontevreden over de wijze waarop hun klacht afgehandeld wordt.

5.2.3 Betalingsbereidheid (WTP)

In de literatuur komt WTP vaak voor als manier om consumentenvoorkeuren voor drinkwaterdiensten te bepalen. Er zijn veel factoren van invloed op de betalingsbereidheid voor drinkwaterdiensten, zoals de huidige waterkwaliteit, betaalbaarheid, de mate van bewustzijn van water management zaken, attitude ten opzichte van het drinkwaterbedrijf, leeftijd, locatie, sociaal-economische status en opleidingsniveau. Oudere respondenten bleken bijvoorbeeld minder bereid meer te betalen om gezondheidsrisico's in de toekomst te vermijden dan jongere. In andere studies was de betalingsbereidheid hoger onder hoger opgeleiden en respondenten met een hoger inkomen.

Mensen hebben doorgaans een grotere betalingsbereidheid voor aspecten van waterlevering die dichter bij hen staan, zoals veilig drinkwater, betere geur en smaak, dan aspecten die verder van hen af staan of van belang zijn op de langere termijn, zoals verbeteringen aan de infrastructuur of vermindering van vervuiling van rivieren.

De betalingsbereidheid in de private sector blijkt minder dan die in de publieke sector en is vrijwel nul als de private leverancier beschouwd wordt als inefficiënt of profiteur. Daar waar de overheid verantwoordelijk is voor de levering van drinkwater blijkt de betalingsbereidheid in sommige gevallen hoger te liggen dan de huidige kostprijs. Het vermoeden bestaat dat vertrouwen van invloed is op de betalingsbereidheid, maar dit behoeft verder onderzoek.

Een Australisch onderzoek laat zien dat consumenten bereid zijn substantieel meer te betalen om de frequentie van leveringsonderbrekingen te reduceren. De uitkomsten van een ander Australisch onderzoek wijzen erop dat consumenten eerder bereid zijn hun gedrag te veranderen (bijvoorbeeld hun tuin alleen te besproeien op aangewezen dagen) dan meer te betalen voor hun water.

Het feit dat mensen flessenwater kopen, kan informatie geven over het bedrag dat zij bereid zijn te betalen voor drinkwater. In West Europa lijkt het gebruik van flessenwater zich te stabiliseren, waaruit afgeleid kan worden dat de maximale betalingsbereidheid zo goed als bereikt is in deze regio. Veel studies wijzen uit dat het gebruik van filters of flessenwater gebaseerd is op esthetische voorkeuren, niet op gezondheidsoverwegingen.

Een aantal gedegen WTP-studies over drinkwater laat zien dat de bedragen waarvan mensen in eerste instantie zeggen dat ze bereid zijn te betalen, uiteindelijk in de praktijk toch te hoog worden bevonden. De betalingsbereidheid uit de WTP-studies (stated preferences) ligt vaak dus hoger dan de werkelijke betalingsbereidheid (revealed preferences). Daarbij komt, dat de bedragen die als som uit WTP-studies komen, vaak lager liggen dan de bedragen die nodig zijn voor investeringen om de gewenste verandering te bewerkstelligen. Met de uitkomsten van WTP-studies moet

dus zorgvuldig worden omgegaan, vooral als ze voor andere doeleinden gebruikt worden dan het achterhalen van relatieve voorkeuren.

5.3 Acceptatie

Hoewel bekend is dat mensen schoon drinkwater wensen, is niet bekend in hoeverre zij enig risico op verminderde drinkwater kwaliteit accepteren.

Een goed gefundeerd onderzoek van het Australische CSIRO heeft de voorkeuren van consumenten op het gebied van leveringsonderbrekingen onderzocht. De resultaten laten zien dat mensen over het algemeen best korte leveringsonderbrekingen aanvaarden zonder klagen. De meest opvallende kenmerken van leveringsonderbrekingen zijn volgens de consumenten:

- Duur van de onderbreking:
  Maximaal acceptabel is vijf uur
- Kennisgeving vooraf:
  Grotere tolerantie voor geplande dan voor ongeplande onderbrekingen
  Indien er vooraf geen waarschuwing wordt gegeven, dan wenst men alsnog op zo kort mogelijke termijn bericht over de oorzaak van de onderbreking, duur, etc.
- Tijdstip waarop de onderbreking plaatsvindt:
  Maakt niet heel veel uit, zolang het maar niet samenvalt met de 'spitsuren' van het dagelijkse huishoudelijke leven
- Jaarlijks aantal onderbrekingen:
  Maximaal acceptabel is twee geplande en twee ongeplande onderbrekingen per jaar

De respondenten gaven aan dat ze liever het probleem opgelost zagen dan een financiële vergoeding te ontvangen.

Met betrekking tot het milieu is gebleken dat op plaatsen waar mensen beseffen dat er watertekorten bestaan en zij de gevolgen daarvan begrijpen, men eerder bereid is alternatieve maatregelen (bijvoorbeeld ontzouting) te accepteren. Desondanks wordt in veel gebieden die met watertekorten kampen direct hergebruik van afvalwater voor drinkwater niet geaccepteerd. In Singapore is direct hergebruik overigens wel geaccepteerd, dankzij een uitgebreide strategie gericht op publiek besef en acceptatie. Voorstanders van direct hergebruik prefereren het hergebruiken van hun eigen afvalwater boven afvalwater afkomstig van een algemene bron.

Hoewel het informeren over of waarschuwen voor nieuwe gevaren of nieuwe behandelmethoden angst kan inboezemen bij de consument, heeft communicatie doorgaans een positieve invloed op de acceptatiebereidheid. In Groot-Brittannië is te zien dat privatisering wantrouwen opwekt. Privatisering blijkt een negatief effect te hebben op acceptatiebereidheid.

6. Recapitulatie

Op basis van de literatuur was het niet mogelijk te bepalen wat 'de consument' wil. Verschillende mensen hebben verschillende voorkeuren. Plaatselijke verschillen (o.a. sociaal-economische, culturele en technologische) maken het lastig onderzoeksuitkomsten te generaliseren.

Een aantal methodologische zaken maken het bovendien moeilijk eenduidig uitspraken te doen over wat 'de consument' wenst, accepteert en tevreden stelt. Verschillen in gebruikte terminologie, onderzoeksopzet, indicatoren, methoden en analyse technieken verhinderen dat de resultaten van het literatuuronderzoek overzichtelijk samen te vatten zijn en er algemeen geldende conclusies uit getrokken kunnen worden.

7. Implementatie

Dit rapport informeert de waterbedrijven over de ontwikkelingen op het gebied van consumentenonderzoek in relatie tot de drinkwaterlevering en -dienstverlening aan particulieren. Waterbedrijven kunnen de uitkomsten van dit onderzoek op verschillende wijze benutten voor hun beleid en bedrijfsvoering:

- Structureren van consumentenonderzoek (theoretisch en praktisch) om een betere basis te vormen voor marketing strategieën en bedrijfsvoering.
- Gefundeerde beslissingen nemen over te gebruiken onderzoeksmethoden.
- Achterhalen wat particuliere klanten wensen, wat ze accepteren, of bereid zijn voor bepaalde service te betalen en wat hen tevreden stemt.
- De bevindingen van het internationale literatuuronderzoek te gebruiken als referentiekader voor te kiezen onderzoeksmethode, aanpak en uitkomsten.
- De inzichten in consumentenwensen, -acceptatie en – tevredenheid gebruiken als basis voor het opzetten van een theoretisch kader om het begrip te vergroten en meer uniformiteit in onderzoek te bewerkstelligen.

Summary

1. Introduction

Water is in many senses unique among consumer products and it has a number of features that mark it out as different from other consumer goods or services. First, access to clean drinking water is now widely considered as a human right. Secondly, safe water supplies are a prerequisite for stable healthy societies. In the third place water supply is not a market in the traditional sense, since consumers have little choice over their tap water supplier.

Most countries in Western Europe have, over the last century and a half, built up a solid drinking water systems, which enable reliable supply of high quality drinking water to their entire populations. With a gradually optimized technical system, water sector issues nowadays revolve primarily around maximizing efficiency and customer satisfaction. In order to have customer satisfaction at a good level it is essential to know about consumers preferences and, based on this knowledge, adjust company operations.

In this report we discuss contemporary research from countries all over the world in the field of domestic consumers of drinking water and methods to assess their preferences for drinking water services.

This study was carried out within the framework of the joint research program of Dutch, Belgian, Aruban and Antillean water companies (BTO) and the EU integrated project of TECHNEAU (Vloerbergh *et al*, 2007; Fife-Schaw *et al*, 2007).

2. Scope and terminology

The study focuses on the preferences of domestic consumers of drinking water. The goal is to distinguish what they prefer and accept in order to identify which service attributes determine satisfaction. Water companies can use this information to optimise operations.

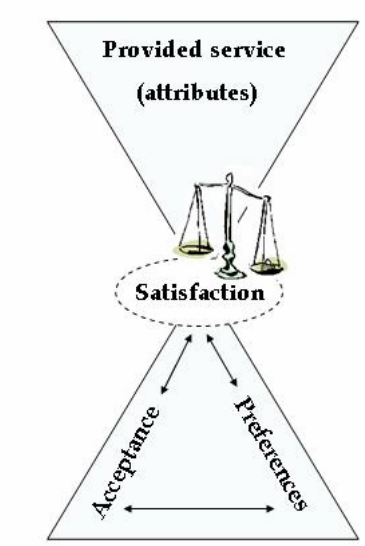
As with most research on consumers, and social science in general, terminological confusion exists. Definitions of the key concepts in this study are:

- Satisfaction: *the fulfilment and gratification of the need for a stated product or service attribute (for example, taste, colour, billing, complaints handling, etc.)*
- Preference: *option that has the greatest anticipated value among a number of options*
- Willingness to pay (WTP): *a person's preparedness to spend an amount of money on a (combination of) product(s) or service(s). WTP also refers to stated preference techniques for economic valuation of goods and services, based on economic welfare theory. WTP studies are often used to elicit consumers' preferences, which are inferred from the relative monetary*

amounts that consumers are prepared to spend on gaining or avoiding (combinations of) service or product features

- Acceptance: *willingness to receive, willingness or ability to tolerate*

In literature there is no common understanding of the way in which consumer preferences, acceptance and satisfaction are related. Based on the literature findings and theoretic backgrounds, Summary Figure 1 is composed to serve as a basic conceptual model. Consumer preferences and acceptance are related. Acceptance can be seen as the lower regions of preferences, beneath which dissatisfaction is likely to occur. (Dis)satisfaction is the result of a weighing of the provided service (attributes) against that what is preferred or accepted. If the provided service meets preferences and stays within the acceptance range, this leads to consumer satisfaction.



Summary Figure 1 Schematic overview of the concepts of acceptance, preferences and satisfaction, related to provided service

3. Assessing satisfaction, preferences and acceptance regarding drinking water services

When assessing consumer preferences for drinking water services properly, one has to bear in mind the characteristics of drinking water (supply). Centralised water supply is a natural monopoly, therefore the theories and assumptions that hold for a perfect market situation, are not necessarily true. Moreover, straightforwardly asking people what their preferences are for a product that – at least for most European consumers - is not top-of-mind, has some drawbacks. The basic nature of drinking water makes it a low-involvement product. People do not have strong attitudes about it and do not have well-formed sets of beliefs about their supplies. This can change, however, when problems with the supply occur or price increases are proposed.

Measuring consumer preferences therefore requires sophisticated methods that reveal what people want without focusing their thoughts, influencing their opinion or raising awareness. Various methods have been assessed that provide reliable and valid outcomes to elicit consumers' preferences, and what they consider acceptable for product and service attributes. The most important methods elucidating preferences do so by determining consumers willingness to pay. If it is known what service attributes people value, what they may not like yet accept, and what they consider to be priorities, water utilities can use this knowledge to invest and operate in such a way that it yields maximum satisfaction.

Summary Table 1 gives a number of suitable approaches to assess consumer acceptance, preferences and satisfaction for drinking water services.

Summary Table 1 Methods to asses consumer satisfaction, acceptance and preferences

Consumer…	Approach
Satisfaction	Questionnaires / interviews
	Strategic Improvement Method
	Subjective Social Indicator
	Gap analysis (a.o. SERVQUAL)
Preferences	Willingness To Pay • Contingent Valuation • Choice Modeling
	Unity-sum-gain technique
Acceptance	Questionnaires / interviews
	Willingness To Accept
	Latitude of Acceptance

Satisfaction

Most satisfaction measurements methods currently used by European water utilities consider people's satisfaction with past performance. These are based on past experiences, and opinions about past, or - at best - current policies and practices of the water utility. In the literature, many customer satisfaction studies can be found, but unfortunately most of them lack any form of framework that reveals the underlying assumptions on which the questions are based. Too often key issues on which the survey questions focus are defined by experts instead of customers. There is no guarantee that the issues defined as important aspects of satisfaction by experts are those of primary interest to the consumer.

Preferences / Willingness to Pay

Consumers' preferences specify in more detail their needs. Preferences are an individual's offset between benefits and costs and are expressed when a person is willing to give up something (cost) to receive something else (benefit). Preferences are not only *what* people want (attributes, choices) but also about the *priorities* they have in mind for it.

When studying consumer preferences in the domain of drinking water there is no single, dominant theory. In the existing literature however, Willingness To Pay (WTP) studies based on economic welfare theory are the most numerous. In WTP studies preferences are inferred from the relative monetary amounts that consumers are willing to pay for given sets or combinations of product/service attributes or to avoid something (like failure). While they can be considered as attempts to formally assess consumer preferences they usually determine relative preferences for product options that are defined by the service provider, though some of the better studies allow consumers to have an input into the nature of these options. Although the assumptions underlying this theory may not hold strongly for the characteristics of drinking water, WTP is nevertheless often used to elicit consumer preferences that do not automatically show from the market. We need to identify the key service quality dimensions that are specific to the water sector. Some of these are evident from the literature (aesthetic qualities, customer relations responsiveness etc.) but there will be others and these need to be identified.

There are a number of conceptual and methodological problems associated with WTP approached that make it unwise to rely on WTP alone when assessing likely consumer responses to future changes. Given contextual effects in survey research any study of the acceptance of a specific technology/service/product needs to involve some qualitative investigation of the contexts in which consumers will make their judgments. It is likely that socio-cultural factors will influence consumers' value judgements and preference and these need to be taken seriously and researched further.

Acceptance

In the strife for a flawless drinking water supply, Western European countries tend to focus on customer satisfaction rather than on acceptance. Measuring acceptance however, is useful to determine the lower limits of what people would tolerate from their water company. It clarifies the boundaries beneath which the provided service is evaluated as dissatisfactory. It thus also gives information about the latitude of service provision that the water company can get away with. If measured, the common method to do so is Willingnes To Accept (WTA). WTA uses similar techniques to measure what people are willing to tolerate as Willingness To Pay (WTP) uses to measure what people are willing to pay and to elicit preferences.

4. Selected method

From the discussed approaches to determine consumers' satisfaction/ preferences/acceptance, a method has been composed which seems appropriate to be used by water utilities. The method is based on research performed by CSIRO, Australia, and consist of several steps. All research should be embedded in the specific setting within which the consumers under investigation function. The steps to be undertaken for the identification and valuation of consumer preferences for drinking water services are:

1. Focus groups with consumers to identify which service attributes they consider relevant. The identified attributes serve as input for the next step.
2. Determination of whether consumers perceive a discontinuity between the level of service provided for the previously depicted attribute(s) and the investments made to provide that service (to detect over- and underservicing). This is elicited by means of the Subjective Social Indicator technique.
3. Valuation of levels of the relevant product or service attributes that customers 'could cope with' by nomination through a Latitude of Acceptance scale. This results in threshold levels of acceptable service.
4. Valuation of the amount of money consumers are willing to pay for their preferred service level(s) by means of a Choice Modelling questionnaire, thereby revealing their preferences and accompanying threshold levels.

It should be noted that all research steps should be well embedded in the specific situation that the consumers under investigation are a part of. Therefore, a qualitative study on the characteristics of the drinking water sector, specifically with regard to consumer issues, is to precede all other research steps.

5. Results of consumer research

5.1 Satisfaction

The satisfaction if European consumers with water supplies is high compared with most other utilities, with only postal services performing better over a range of service attributes. It is argued that drinking water quality satisfaction and risk perception are closely related. Consumers' perceptions of drinking water risk result from a combination of objective information together with a combination of social, cultural and psychological factors. Dissatisfaction may not only emanate from service attributes like taste and price, but also from lack of communication.

In general Western European consumers are quite satisfatied with the taste, odour and other aesthetic aspects (e.g. appearance, hardness) of the tap water. Only the chlorine in tap water is a quite strong dissatisfier. Consumers are often opposed to any changes in quality, even if those changes are well within the quality limits. Many studies find that consumption of filtered or bottled water is based on aesthetic preferences more than for reasons of health.

Given these findings on satisfaction, (risk) perception and communication we now turn to look specifically at preferences and acceptance.

5.2 Preferences

5.2.1 General findings on preferences

Most studies show that the underlying consumers' primary preference is that their supplier will continuously provide 100% safe, clean drinking water for a reasonable price. What remains unclear is what proportion of the population

expect less than 100% safety and what levels of risk are *acceptable* to which sets of consumers.

A common understanding among consumers says that there should be an equal supply and pricing of drinking water, independent of the area where one lives. In general metering is seen as desirable for efficient water pricing and encouraging conservation. Related to pricing consumers prefer a fair balance between the profit of water companies and services offered.

Although the idea that suppliers ought to provide information about their performance to consumers is widely supported by consumer groups, there is little clarity about what information consumers actually want or whether the indicators deemed relevant by the industry address consumers' information needs. In one of the studies it was concluded that consumers should be able to get information quickly at the moment they need it and in a format that can be easily understood.

5.2.2 Complaints as an alternative indicator for preferences

Most water companies recognise that customer complaints are an important indicator of dissatisfaction, and duly monitor them closely. Although in general in Europe the rate of complaints to water companies seems to be relatively low, a large part of the consumers who made a complaint are dissatisfied with the response. It should be noted that complaining rates are an imprecise indicator of the level of consumer dissatisfaction, since some dissatisfied consumers will complain but others will not for various reasons.

5.2.3 Willingness to pay

In the literature, WTP techniques are most often used to elicit consumer preferences for drinking water or related services. There are a multitude of factors affecting WTP for water services, like existing water quality, affordability, consumers' level of awareness of water management issues, consumers attitude towards the water company, age, location, socio-economic status (SES) and level of education. It was for example found that older respondents were more reluctant to pay any more to avoid future health threats from drinking water than younger ones. In other cases the WTP was higher, with higher income or higher education.

WTP is greater for more immediate aspects of the supply (e.g. safe drinking water, better taste and odour) than for more long term or distal supply issues (e.g. infrastructure improvements, decreased river pollution).

WTP is lower when the supplier is in the private sector and WTP is close to zero if the private sector supplier is seen to be wasteful or profiteering. Where the state/regional government is responsible WTP can be higher than the status quo. Trust in the supplier and their motives probably moderate WTP but this needs to be tested.

One Australian study shows that consumers are willing to pay positive amounts to reduce the frequency with which interruptions occur. Another

Australian study showed that consumers seem more willing to change their behaviour (e.g. watering their gardens on alternative days) rather than pay more on their bills.

Bottled water purchasing can provide information about consumers' WTP for water services as the purchase of bottled water may indirectly reveal a WTP for drinking water with different attributes (a 'revealed preference' in economic terms). Recent reports show that sales of bottled water may be reaching a plateau in Western Europe, suggesting that the maximum WTP for bottled water has, or is just about to be, reached in this region.

A number of high quality WTP studies have been conducted in the water domain but as yet there is no clear evidence that WTP values achieved in these studies are matched by actual payment of them when preferred options are turned into real policies or services. In fact many water-related WTP studies produce WTP values that are below the cost of implementing the relevant changes. Care should thus be taken with use of the research findings other than to elicit consumer preferences for drinking water services.

5.3 Acceptance

In a well established study the Australian institute CSIRO investigated consumer acceptance regarding interruptions to their water supply. Overall, the results demonstrated that people could cope with short interruptions without complaining. Consumers deemed the most salient qualities of interruptions to be:

- Duration of the interruption:
  Up to five hours acceptable.
- Notification in advance:
  M*ore tolerance for planned than for unplanned interruptions.*
  If no notification wish for much – immediate - feedback on cause, durations, etc.
- Time of day the interruption happened:
  Acceptable as long as not coinciding with 'key times' in the daily live.
- Number of interruptions per year (planned and unplanned):
  Up to two planned and two unplanned interruptions per year acceptable.

In general customers stated that they would rather have problems fixed than any form of rebate.

Concerning environmental issues there is evidence that where water stress is widely understood by the public, one is willing to accept alternative measures to improve supplies (e.g. desalination). However, in areas with water shortage using recycled water for drinking water is not acceptable for the majority of the consumers, unless an extensive strategy was deployed to address public awareness and acceptance (like in Singapore). For the consumers in favour it is was found that they are more willing to use their own recycled wastewater than wastewater drawn from a common source.

Although alerting the publics to new hazards or new water treatment processes may cause anxiety, communication is believed to have a positive effect on consumers' willingness to accept.

5.4 Critical notes

While summarizing the findings and drawing conclusions on satisfaction, preferences, willingness to pay, and acceptance some complicating factors arose. First of all there is the problem of terminological confusion that make it difficult to compare results of different studies. Secondly, the studies under review tend to have different aims and set-ups. Even in studies with a similar scope, different indicators are used. Thirdly, distinct research methods have been used, and fourthly, the techniques used to analyze the outcomes of the studies vary. As a result of the aforementioned factors, comparison of the results of different studies is a comprehensive and sometimes impossible task. Furthermore water has a unique position as a consumer product and thus care is needed in extrapolating findings and theories from other consumer related areas. The conclusions therefore often lack a general and sound base, nevertheless are still considered useful for drinking water companies and researchers. The findings presented in this report – although fractured - reveal relations between factors and determinants of, among other things, satisfaction. This insight may feed into a conceptual framework that should be constructed to explain consumer issues in the drinking water context. Moreover, sharing of previous research and it's findings provides the sector with experience in consumer research in the field of drinking water from which we can learn for future research.

6. Implementation

This study informs water companies about the developments in the field of consumer research relating to domestic drinking water (services). Water companies can implement the outcomes of this study in different ways for their policy making and operations:

- Structure the set-up of consumer research, so the results form a better basis for marketing strategy and operations.
- Make well-founded decisions regarding methods for consumer research.
- Assess what their domestic customers prefer, accept and if they are willing to pay for certain services by applying the selected method.
- Create a frame of reference for researchers worldwide of what has already been studied, methods used, and experiences to learn from
- Construct an all encompassing theoretical framework for consumer preferences, satisfaction, acceptation and interaction with the water company based on the generated insights.

Content

1 Introduction

1.1 Water: a unique product

Water is in many senses unique among consumer products and it has a number of features that mark it out as different from other consumer goods or services. First, access to clean drinking water is now widely considered a human right. When the Universal Declaration of Human Rights was first drafted water and air were omitted as they were regarded as necessary preconditions for all other human rights and so were not explicitly mentioned. In November 2002 the UN Committee on Economic, Social and Cultural Rights finally affirmed that access to clean water was indeed a fundamental human right. Second, safe water supplies are a prerequisite for stable healthy societies. While wealthy consumers can choose to drink bottled water to avoid health risks, this is not an option for large portions of the citizens of even the most developed European nations. The current large populations and the growing economies of Europe are fundamentally dependent on the existence of safe drinking water supplies and thus governments are motivated to ensure their continued existence and success.

Unlike electricity or gas supplies, which are increasingly the subject of competition between privatised suppliers, most European consumers have little choice over their tap water supplier. If they desire a better or different water supply they have to either purchase packed water (in bottles or sachets) or seek private well supplies if such are available locally. This is not a market in the traditional sense and indeed even in the UK, where the water supply system has been most fully privatised, consumers cannot chose a different supplier if they become dissatisfied with their provision.

In common with other utilities like gas and electricity supplies, European consumers generally take these for granted until there is some disruption in supply or price rises are proposed (e.g. Candidate Countries Eurobarometer, 2003; Consumer Council for Water, 2005). However, unlike gas and electricity, humans have an intimate physical relationship with their water and any health risks it might pose can vary over time. Failures in the water supply system can prove catastrophic for the consumer (cf. the Camelford UK aluminium sulphate poisoning in 1988, Milwaukee US Cryptosporidium and Giardia contamination in 1993). We ingest water and, as with food, have a clear expectation that it should not harm us.

1.2 Rationale of the research

Most countries in Western Europe have, over the last century and a half, built up a solid drinking water systems, which enable reliable supply of high quality drinking water to their entire populations. With a gradually optimised technical system, water sector issues nowadays revolve primarily around maximizing efficiency and customer satisfaction. For this purpose, water companies carry out customer research of various kinds, with various

research subjects and methods. One of the important aims of this research is to objectively assess consumers' preferences. The outcome of these studies can be used to help shift the company policy and operations towards a more customer oriented approach.

In this report we discuss contemporary research from countries all over the world in the field of domestic consumers of drinking water and methods to assess their preferences for drinking waters services. We also discuss the pros and cons of the approaches most widely used and we explain why widely used market research techniques do not necessarily apply to the drinking water sector. The aim is to learn from others and previous experiences and based on that, tailor a method to assess consumer preferences for drinking water services. In order to reach this goal the report presents an overview of the research that addresses the following general questions:

1. Which aspects (attributes) of drinking water supply and services determine domestic consumer satisfaction?
2. What are domestic consumers' preferences for drinking water services?
3. What are domestic consumers willing to pay for improved services?
4. What do domestic consumers consider acceptable in terms of the product and the service they receive for the price they pay?

To answer these questions a desk study is performed, which includes international literature and customer surveys commissioned by Dutch drinking water companies.

This study is carried out within the framework of the joint research program of Dutch, Belgian, Aruban and Antillean water companies (BTO) and the EU integrated project of TECHNEAU (Vloerbergh *et al*, 2007; Fife-Schaw *et al*, 2007).

1.3 Focus and structure of the report

Given the special features of water much of the general literature on the behaviour of consumers exercising preferences in markets is of questionable relevance. We discuss some general models of the consumer but for most of this report we focus primarily on water-specific studies. The focus of this report is on consumer preferences in relation to domestic drinking water supplies and services and only, when relevant to drinking water, on waste water services and other non-potable uses such as irrigation. In chapter 2, the scope of the study is defined and concepts related to consumer preferences encountered in the literature are briefly explained.

Researching preferences in the water sector is not a straight forward task. Whereas consumer preferences for most consumption products become manifest from the choices made in the market, centralised water supply is a natural monopoly and does not operate in a perfect market. As a result, investigating consumer preferences is more complex than analyzing sales figures. Moreover, straightforwardly asking people what they would

prefer with regard to drinking water has some drawbacks as well. Consumers often cannot articulate their preferences or indeed may not have considered preferences for a product or service which they take for granted and rarely think about. In some situations they may even be motivated to misrepresent their preferences to researchers especially if they believe that their answers will have an effect on the prices they pay for their water. Approaches to assess consumer preferences, as well as implications of the mentioned methodological issues are discussed in chapter 3.

In chapter 4, international research with regard to consumer preferences for drinking water supply and services is reviewed. Some care is required in interpreting the various research reports discussed. It should also be noted that consumer preferences are closely related to regional and local circumstances (cultural, political, economical, technological, etc.) and the nature of the product of water itself. Finally, we briefly discuss consumers' taste and odour preferences but do so only in the context of these as triggers for consumer complaints and use of bottled waters. We do not discuss particular threshold levels of contaminants as they are large in number and are already embedded in the EU Drinking Water Directive's and WHO standards. Most suppliers conduct their own sensory research relating directly to their own water and supply circumstances and should be well aware of this aspect of consumer preferences.

Chapter 5 recapitulates on the research findings and suggests ways to implement these in policy making and operations for the benefit of the water companies.

2 Scope and terminology

2.1 Scope

This study focuses on the preferences of domestic consumers of drinking water. The goal is to distinguish what they prefer and accept in order to identify which indicators determine satisfaction. Besides the reciprocal relationships between the three key concepts, other factors seem to influence people's preferences, acceptance and satisfaction as well. The relevant concepts mentioned in the literature are represented in the triangle in Figure 1. The existing literature acknowledges that links between these concepts exist, however it often does not indicate how these concepts are linked. In the following paragraph, the concepts are defined. More detailed background information on the presumed models on which the definitions are based, is given in appendix I.

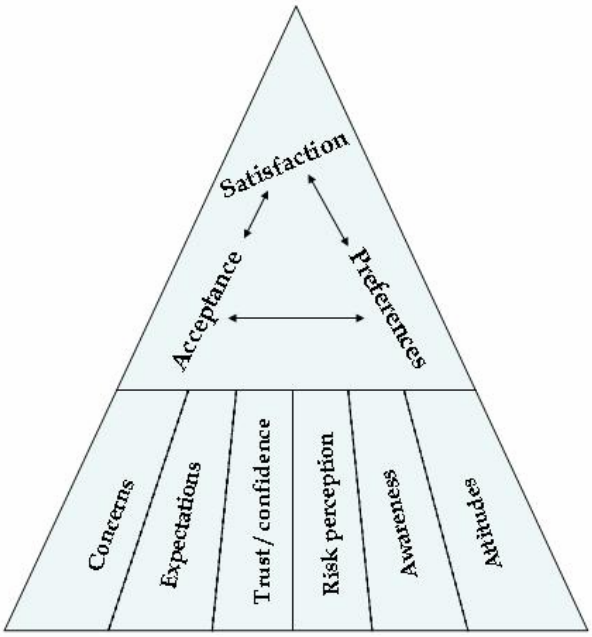


Figure 1 Scope of the report: How to assess consumers' acceptance, preferences and satisfaction?

2.2 Terminology

As with most research on consumers, and social science in general, there is a lot of terminological confusion and sometimes a lack of rigour. This is acknowledged within the academic literature. The following definitions of key terms are provided to clarify the following discussion of the literature. At the end of this document a glossary is added with brief definitions of the key concepts used in this review.

Consumer satisfaction
Consumer satisfaction and acceptance are often considered in the literature to be closely linked yet these are distinct concepts. Satisfaction is *the fulfilment and gratification of the need for a stated good or service*, here, water. Satisfaction particularly pertains to a past or current state and does not conclude on the gratification or fulfilment of potential future needs. In appendix I additional theoretical background information is given.

Consumer preferences
This is used primarily to mean *an option that has the greatest anticipated value among a number of options*. This is an economic definition and does not tap into 'wishes' or 'dreams' (for e.g. that safe drinking water was free, that there should be world peace) but for all practical purposes is an appropriate definition. Preference and acceptance can in certain circumstances mean the same thing but it is useful to keep the distinction in mind with preference tending to indicate choices among neutral or more valued options with acceptance indicating a willingness to tolerate the status quo or some less desirable option.

Preferences are linked to satisfaction with a reciprocal relationship; preferences indicate what consumers find important and are thereby indicators for satisfaction. At the same time, the level of satisfaction about certain services determines the preferences for those and other services. For example, if a company's client satisfaction research shows that clients are not satisfied with the way complaints are handled by their customer relations center, actions are taken to improve that service. When it reaches a sufficient or high level of satisfaction, the client's preferences may consequently shift to other services that as a result of the improvement of one aspect of the services has become more apparent.

Willingness to pay (WTP)
By measuring how much an individual is willing to pay for a stated good or service, their preferences are assumed to be revealed. Willingness to pay techniques elicit individuals' money valuations of costs and benefits. In other words the amount of money they are willing to pay to gain or avoid something.

Consumer acceptance
Acceptance describes *consumer willingness to receive and/or to tolerate*. For example, a customer might accept the occurrence of a certain number of yearly supply interruptions given a certain price. Consumer acceptance and satisfaction are related, as the first is a precursor of the latter. However, despite the fact that satisfaction and acceptance can be thought of as lying on a continuum, acceptance does not automatically lead to satisfaction. Consumers (implicitly) weigh the product or service they receive against their expectations, needs, and preferences. This determines the way in which people evaluate companies' or utilities' performance. Only when a consumer's needs for a stated good or service are met, and especially when the service provided corresponds with their preferences, will they feel

satisfied. Customer satisfaction can be enhanced when their needs are met (in terms of both quality and quantity) and accord with their preferences. At the other end of this dimension, where the service provided conflicts with the prevailing needs or preferences, customers may experience feelings of dissatisfaction.

Acceptance is also used in the literature to mean an affirmative answer to a proposal. The distinction is subtle but there are occasions where consumers might not agree to a proposal yet accept the subsequent service in the sense of tolerating it. In appendix I additional information is given on the relation of acceptance, trust and risk perception, and factors that influence levels of acceptance.

Relation between satisfaction, acceptance and preferences
For this study it is defined that when the provided service (better) fulfils the consumer's preferences and stays within the ranges of acceptance, this leads to (enhanced) consumer satisfaction. Figure 2 shows the schematic overview of the key concepts that served as a basis for understanding the interrelatedness of the concepts.

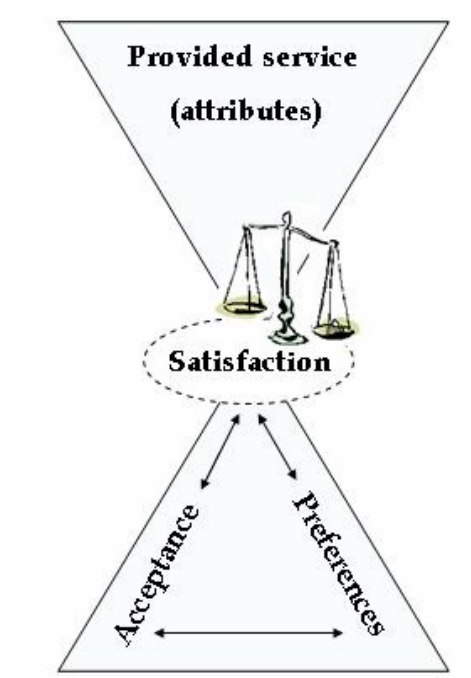


Figure 2 Schematic overview of the concepts of acceptance, preferences and satisfaction, related to service

Product- and service attributes
Attributes refer to *characteristics, or aspects of a product or service*. Examples of product attributes include taste and odour, colour, and price. Attributes can also pertain to indirect product characteristics such as fuel usage for drinking water production, safety, treatment technology or harmful effects of disposal. Service attributes can be related for example to supply issues like frequency

and duration of interruptions, pressure, or to customer relation issues such as the friendliness of personnel, the speed and correctness of answers provided, etc. If it is known which service attributes and accompanying levels people value, water companies can use this knowledge to yield, for example, maximum satisfaction with their investments. The attributes that consumers consider most important and their preferred levels can be used as Key Performance Indicators (KPI's).

Consumer concerns
These are *expressed anxieties or unease over an object broadly defined* (e.g. discoloured tap water or a proposal to change the water pricing structure). Background information on the relation with acceptance can be found in appendix I.

Consumer expectations
The distinction between expectations and preferences is often blurred, though the concepts are distinct. Expectation is used in three slightly differing senses in the literature. One is *the act of expecting or looking forward – a belief about what will happen in the future*. Most consumers in Europe expect that clean and safe water will come out of their taps the next time they turn them on. A related but more technical use of expectation is *to denote a more formal estimation of the probability of an event occurring*. These first two definitions can be distinguished from preference in that preferences refer to some desired state and, as in the above definition, imply that more than one state is possible and that there are some options. Unfortunately expectation is also used more loosely to mean *a requirement or demand for something and in this sense is a kind of strong preference*. When reading the literature it is important to ascertain which definition is being used.

Consumer awareness
Consumer awareness is *the level of knowledge about, in this case, water. It includes the water company, regulatory framework, supply system and service, or the water itself*. In most research the adequacy of this awareness is anchored against the service provider or regulator's perspective on the supply. Where consumer awareness does not equate with this industry perspective this is often termed a consumer (mis)perception. However, it should be noted that there is a distinction between holding factually incorrect knowledge about the supply system (e.g. that the water comes from a river when it comes from an aquifer) and differing perspectives on, say, the safety of the supply. In the latter example assessments of safety are judgements made under uncertainty about the future and thus have a legitimately contestable truth status. What is acceptably safe is a matter of judgment (potentially based on 'good science' but a judgement under uncertainty nonetheless) and may or may not be a 'mis-perception'.

Risk perception
This is a term used rather loosely in the literature to mean the *level of risk associated with exposure to a hazard*. Unfortunately a 'risk' is often used to mean the specific hazard itself rather than a formal risk which is a combined

assessment of the likelihood and magnitude of harm that may occur as a result of exposure to the hazard.

Consumer trust

In general trust represents *a firm belief in the reliability or truth or strength etc. of a person or thing*. It is the *willingness to make oneself vulnerable based on a perceived similarity of the values and intentions of another person / group / organization etc.)*. Also used in the literature to mean confidence in the sense of having an expectation that something will happen. More background information on the distinction beween trust and confidence and the duality in theoretical models of the relation with acceptance can be found in appendix I.

Consumer attitudes

An attitude is a positive or negative evaluation of a social object or action. A 'social object' in the present context might mean the water company, water regulations, supply system and service, or the water itself. Many theories of attitudes (e.g. the well-known theory of planned behaviour, Ajzen, 1985) have attitude as a factor involved in determining behavioural choices however there is considerable continuing debate about when, and in what circumstances, attitudes are important determinants of behaviour. An attitude toward something should thus not be taken to imply that attitude-consistent behaviour will automatically follow.

Consumers and the public

While discussing definitional clarity it is worth acknowledging that 'the consumer' is not a representative of a single homogeneous group, 'the public'. Social scientists prefer to use the term 'publics' to reflect the idea that not all members of 'the public' share the same goals and values nor have the same relative power status within any society. A crude example is that the poor/unemployed are unable to pay for some services and it would be a mistake to ignore the importance of this different status when studying preferences.

In the case of water consumption, all members of the population have to consume water from some source but some are direct payers of water bills (customers), some pay indirectly (e.g. those living in care homes, or some forms of rented accommodation) and others are dependents of customers. These differing groups will have differing relationships with suppliers and may well have different preferences.

3 Assessing preferences, acceptance and satisfaction regarding drinking water services

3.1 Introduction

In chapter 1 it was already stated that researching preferences in the water sector is not a straight forward task. Centralised water supply is a natural monopoly, so the theories and assumptions that hold for a perfect market situation, are not necessarily true.

In addition, straightforwardly asking people what their preferences are for a product that – at least for most European consumers - is not top-of-mind, has some drawbacks. The basic nature of drinking water makes it a low-involvement product. People do not think about it, where it comes from, how it is treated and distributed, as long as it is available and does not look, smell or taste odd. Attitudes towards drinking water are generally not crystallised, meaning that people do not have strong attitudes about water and do not have well-formed sets of beliefs about their supplies. In regions with well developed water systems, where people generally have clean tap water available 24 hours per day, people have little interest in knowing details of the product, or related services (Olivier, 2006). Because water is a low-involvement product, people do not have strong opinions, unless and until problems with the supply occur or price increases are proposed. A higher level of education generally increases involvement. This is in line with the finding that higher educated people generally invest more in their health (with the exception of alcohol consumption) than people with lower levels of education (Van Campen and Schellingerhout, 2005; Kooiker, Den Draak and Van Campen, 2006). Media reports about polluted drinking water or malpractices of the water utility can alarm and upset people, resulting in increased awareness and possibly distrust. An inverse relation between involvement and perceived certainty of the provision of clean drinking water exists. Measuring consumer's preferences requires sophisticated methods that reveal what people want without focusing their thoughts, influencing their opinion or raising awareness.

Asking people what they would tolerate regarding a topic that is not one that they routinely think about might result in a biased and/or meaningless response. For example, people may think their answer will have consequences, financially or otherwise, and give 'strategic' answers. Imagine a customer, who has a low level of trust in their water utility, is asked whether they would accept twice as many supply interruptions as they had experienced in the last year. This customer is likely to give a negative answer, even though they might not have experienced any supply interruptions at all if they suspect that the water utility is attempting to lower the level of provided service. Moreover, people may find it difficult to relate to real-life

consequences of what is asked in case of topics they do not usually think about or have not experienced.

A literature study was done to investigate methods and approaches to elicit consumers' preferences for drinking water services, and to assess acceptability and levels of (dis)satisfaction. Many studies in the field of marketing and customer research for food- and beverages were reviewed, as well as environmental studies. In appendix II an overview is given of the initially studied international consumer related reports and articles, as well as Dutch consumer research in (former) public utility sectors.

In this chapter we will provide an overview of methods available to assess the satisfaction, preferences, and level of acceptance (Table 1). Appropriate quantitative methods for exploring customer preferences in the drinking water industry are discussed and recommendations are made to guide future research.

Table 1 Methods to assess consumer acceptance, satisfaction and preferences described in this report

Consumer…	Method	Section
Satisfaction	Questionnaires / interviews	3.2.1
	Strategic Improvement Method	3.2.2
	Subjective Social Indicator	3.2.3
	Gap analysis (a.o. SERVQUAL)	3.2.4
Preferences	Willingness To Pay	3.3.1
	• Contingent Valuation	3.3.2
	• Choice Modeling	3.3.3
	Unity-sum-gain technique	3.3.4
Acceptance	Questionnaires / interviews	3.4.1
	Willingness To Accept	3.4.2
	Latitude of Acceptance	3.4.3

3.2 Assessing satisfaction

Most satisfaction measurements methods currently used by water utilities compare people's satisfaction against past performance. The measures pose questions about past experiences, and opinions on past, or - at best - current policies and practices of the water utility. In the literature, many customer satisfaction studies can be found but unfortunately, many of them lack any form of framework that reveals the underlying assumptions on which the questions are based. Too often problems that are the subject of the survey questions are defined by experts instead of customers. There is no guarantee that the issues defined as important aspects of satisfaction by experts are those of primary interest to the consumer.

3.2.1 *Satisfaction Questionnaires*

Research on satisfaction with service quality and service providers has a long history but it is probably fair to conclude that this research has largely been of an *ad hoc* nature with numerous theoretically unconnected surveys and polls.

In the literature review, many client satisfaction questionnaires were encountered. This popular technique in market research assesses customer satisfaction by asking people in a survey or interview to rate satisfaction (or approval) of different facets of the service provided (e.g. staff attitude, speed of delivery, cost). When applying this technique to tap water services, it should be noted that drinking water is a basic need, related to people's health, of which the provision is a natural monopoly. It is a low-involvement and low-interest product and, generally, people have little interest in acquiring information about it, or formulating opinions. Inquiring about their satisfaction often results in respondents answering they are 'satisfied'. For example, the average result of Dutch drinking water companies' satisfaction questionnaires is 7.4 on a 10-point scale[1], with a deviation of plus or minus 0.2 points. It is not clear whether this reflects a real level of satisfaction or simply that the response had been generated at the time of asking. Special attention is therefore required in choosing the subjects under review and wording, in addition to the methodological issues.

As explained in the previous section, expert priorities and opinions are likely to differ from those of consumers. A way to check compatibility of key-attributes (critical attributes that are the main determinants of the subject under consideration) is by means of focus groups. The experts create a gross list of attributes, which can be compared to the list constructed by consumers in focus groups. The result is a net list of key-attributes that are real issues to consumers. At the same time, this gives an idea of the extent to which experts' perceptions of consumer issues and consumers' perceptions of issues relevant to them differ or comply.

3.2.2 *Strategic Improvement Method (SIM)*

A method that acknowledges the interrelation between priorities and satisfaction, and uses it to map customer preferences, is the Strategy Improvement Method (SIM).

SIM is based on the relative importance that people attribute to a set of key-factors and their valuation of the water utility's performance on those factors (their satisfaction). The method uses a strategic improvement matrix (Van der Pol, 2005) to delineate the performance of certain aspects of service provision from the customer's perspective and the importance they attribute to the individual service aspects.

To construct a strategic improvement matrix, a questionnaire is composed in which respondents are asked to rate the water utility's performance on key-

[1] Period 2003 t/m 2005, see appendices II and VI

factors. The key-factors are predetermined by means of qualitative research. Interviews or focus groups with experts and consumers (separately) may help to identify the key-issues. An example of a strategic improvement matrix is given in Figure 3. The example is an adapted version of one of the studies carried out for the Dutch drinking water utilities by TNS-NIPO (E. Duijser et al, 2004).

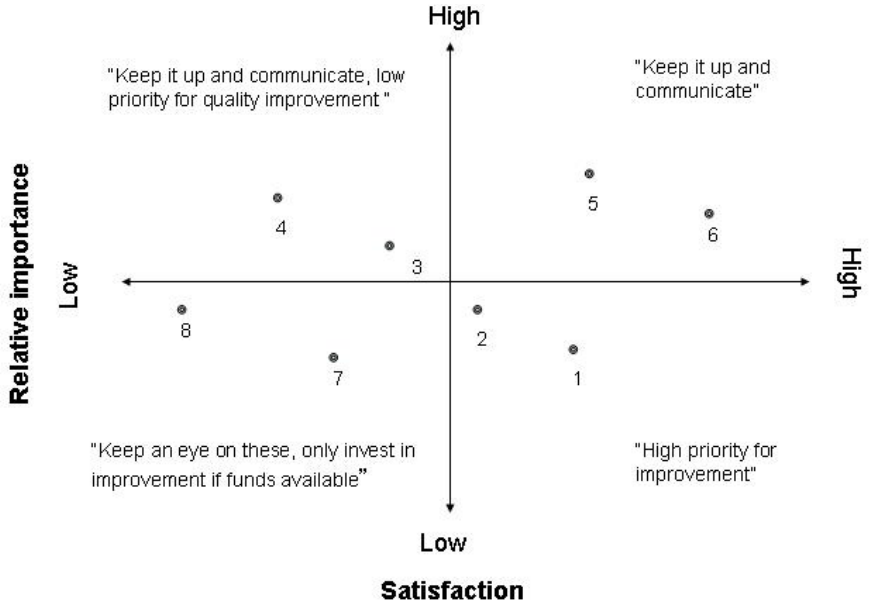


Figure 3 Example of a Strategic Improvement Matrix for drinking water supply services [Source: Duijser et al, 2004]

In Figure 3 the numbered dots represent key-factors of service provision that were identified in qualitative research. The numbers represent:

1. friendliness of the call-center
2. correct answers by the call-center
3. speed of answered phone calls by the call-center
4. communication in general
5. price
6. product quality
7. environment and recreation
8. billing

The figure suggests that the investments likely to yield the greatest improvement in satisfaction are those that relate to the functioning of the call-centre. If they improve their friendliness and provide adequate answers, customer satisfaction should be improved. Price and product quality are attributes that respondents find important and satisfactory and it would therefore be advisable to use these in promotional activities. The next aspect the water utility in this example might want to work on would either be the speed of answering phone calls by the call-center, or billing performance. People consider speed more important, although they are generally already

satisfied in this respect, whereas billing performance scores much lower on the performance axis, and only slightly lower on the importance axis.

SIM measures customer satisfaction with key-aspects, with image-aspects and general satisfaction. Key-aspects are those facets of service that best predict/explain overall satisfaction. The relevance of those aspects is measured implicitly by calculating the correlation between the overall satisfaction-score on the one hand and the scores of the key-aspects on the other hand. If customers often rate both an individual aspect and the overall satisfaction high, then it is assumed that there is a relationship between the two and that the aspect has a great impact on the overall satisfaction. By means of regression analysis the relative importance of the different key-aspects is mapped. The advantage of this approach is that it gives results that reflect respondent's more considered views relative to straightforwardly asking what people find important, because the latter often results in participants saying that all aspects are 'very relevant'.

So instead of asking what people find relevant, the relative importance of the distinct attributes is derived from the relation of the satisfaction on the key-aspects with the general satisfaction. Example questions from the Hydron Flevoland (The Netherlands) customer research (Van der Pol, 2005) can help to illustrate this.

---

1. Please depict the level to which you agree with the following statements:

- *The water company informed me quickly about the reason of contacting me*
- *The information provided by the water company was clear and understandable*
- *The water company's employees were competent*

Do you

1) Totally agree
2) Somewhat agree
3) Somewhat disagree
4) Totally disagree
5) Not relevant
6) Don't know

---

2. If you think about your water company in general, are you:

1) Very satisfied
2) Satisfied
3) Dissatisfied
4) Very dissatisfied
5) Don't know

---

3. Can you state for every of the following aspect whether you are satisfied or dissatisfied about it?

- *Informing clients about news and current issues*
- *Quality of the tap water*
- *Quality of the service provided by the Water Company*
- *Care for as few as possible supply interruptions*
- *In case of supply interruption quick repair with as little hindrance as possible*

1) Very satisfied
2) Satisfied
3) Dissatisfied
4) Very dissatisfied
5) Don't know

The result is a SIM matrix in which the points mentioned in the first question are plotted, on a horizontal satisfaction scale and a vertical relevance scale. The relevance is calculated by means of regression analysis.

Pros and Cons
The issue of 'socially desirable' answers is addressed by this method, as the SIM matrix reveals the implicit relevance. Interestingly, studies on environmental issues and aid for developing countries using this technique often show a difference between the 'stated relevance' and the 'revealed relevance'.

One criticism of this method is that general satisfaction is assumed to be a linear function of the key-aspects satisfaction (as is implied by the use of linear multiple regression procedures). Many satisfaction studies reveal so-called 'halo-effects' where customers appear to make a global assessment of whether they were satisfied (or not) with the service as a whole and then infer that they must have been satisfied with specific parts of it after the event.

SIM, like most other techniques for measuring customer satisfaction, poses questions about previous experiences with water utilities. This implies that the results apply to performance that has already been delivered. However, since the relative importance reflects the respondent's current preferences, improvement actions aimed at these preferences can enhance near future satisfaction levels.

If the aim is to improve future levels of satisfaction, a method that enquires about the future needs of customers is preferred. Such a method is the Subjective Social Indicator described in the next paragraph.

3.2.3 Subjective Social Indicator (SSI)

Australian research conducted by CSIRO (2002) describes the use of a Subjective Social Indicator (SSI) to assess consumer preferences for levels of service regarding continuity of supply. Shinn and Gregg (1984) originally created a SSI to measure consumer satisfaction with a service attribute. Their aim was to identify the needs of governments to provide a certain service level by asking respondents (the publics) about their perceptions of the current levels of service provision and the government's degree of responsibility to provide the service. By additionally asking people what their preferences are for greater spending on service issues, an indication of preferences for future levels of service provision can be achieved.

The Need for Service Provision (NSP) score is the gap between the Achieved levels of Service Provision (ASP) and the Goal of Service Provision (GSP). Figure 4 visualizes the concept of NSP.

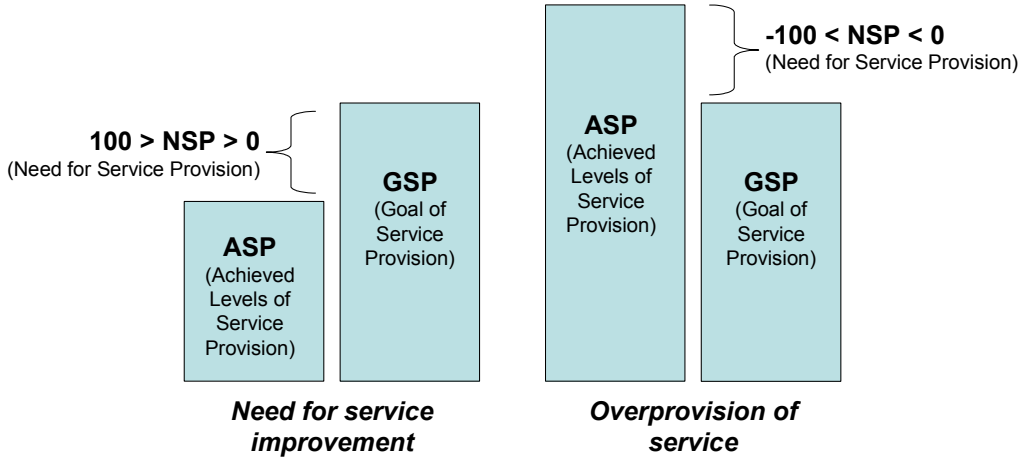


Figure 4 NSP = GSP – ASP. The left situation depicts a need for improvement of a service, the right situation indicates overprovision of service

In the example of CSIRO (Speers et al, 2002), ASP is measured by asking respondents to rate from 1 to 10:

A) how satisfied they are with the ways the water utility handles water pressure, quality, restriction and interruption issues, and;
B) their preference for greater spending on those issues.

By summing both scores from A and B, and multiplying the total score by 5, the ASP-scores could vary from 0 to 100.

GSP is measured by asking respondents to rate on a 1 to 10 scale:

A) the importance of the ways the four water issues are handled in regard to their present lifestyle, and;
B) the responsibility of the water utility to provide a good level of service for handling those four water services.

Again, the two scores could be summed and multiplied by 5 to result in a 0 - 100 GSP-index. The final NSP-score is the potential gap between GSP and ASP, and varies between -100 and + 100. A negative score reveals over-provision of service, whereas a positive score indicates a need for improvement of the service.

In the CSIRO example, the respondents were classified into two groups, the first group being customers who *had*, the other group being the respondents who *had not* experienced water interruption before. No significant differences appeared in the answers of the groups. In this particular study, any experience with supply interruptions did not appear to influence the outcome. Furthermore, the results were tested for 'embedding', or 'context' effects. By including three other water supply attributes that were not related to supply interruptions, it was possible to investigate whether the respondent's preferences were over-stated due to the context in which the questions were asked. There appeared to be no embedding effect in this study. However, for the purpose of assessing consumer preferences for certain service attributes, it is recommended that researchers always ask

about more than one particular attribute (M. Po et al, 2002)[2]. Besides putting the preferences in perspective of other relevant supply service issues, it is also a way to encourage the respondents to come to an understanding of issues relevant to water service provision. By posing questions that bring certain aspects to mind that are easily overseen – especially in the case of low-involvement issues – topics can be put in perspective. This way of focusing people's minds on different aspects of the subject and thereby placing it in a certain context is referred to as 'streaming' (Baarsma, 2006). This is especially important when there is no, or a low awareness of the issues under consideration, as is the case with water supply issues.

Pros and cons
By asking customers about their preferences for greater spending on the issues that affect their satisfaction most, they are asked about where they would like to see the future investments allocated to.

A problem that may arise when constructing SSI questions is which other attributes to include. This demands thorough thinking on behalf of the researcher and at the same time enough distance from the subject to be able to look at it in the way laymen do. Preceding focus groups can partly solve this problem, however, to neutrally guide and fully employ the process of streaming, skilled researchers are required.

In the 2002 CSIRO study, SSI was used to elicit what the issues of concern were to customers, and which attributes they considered priorities for improvement. SSI is considered a key methodological advance that enables customer preferences to be identified. It is proposed as an introductory part to a WTP questionnaire for the elicitation of consumers' preferences.

3.2.4 SERVQUAL and SERVPERF (Gap analysis)

Theoretic backgrounds of methods that are based on measurement of gaps between the consumers' expectations and perceptions of the provided services are discussed in appendix I. Similar to SSI, scores of the provider performance perceived by customers are subtracted from the customer expectation score. The greater the positive gap between the performance and the expectation the better service quality. Besides the gap that indicates a lack or abundance of satisfaction, four other gaps may exist between perceived and expected product or service delivery at different levels in the organization. The possible gaps are depicted in the SERVQUAL-model in Figure 5. Although the model is primarily aimed at products, it can also be used for the evaluation of provided services.

[2] also recommended in an interview by drs. B. Baarsma, scientific researcher at Stichting Economisch Onderzoek (SEO), Amsterdam d.d. 25 September 2006

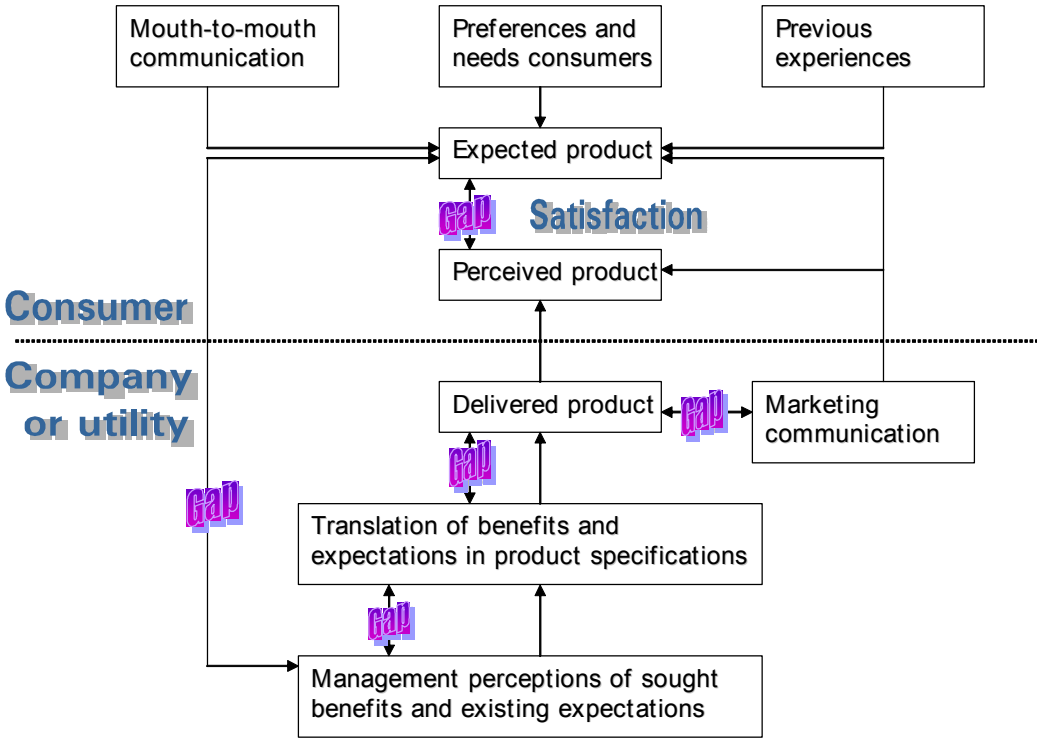


Figure 5 The SERVQUAL-model [Source: Mandour et al, 2005, p. 213]

The SERVQUAL model includes five empirical factors. These factors can be seen as determinants of the quality of the provided service for the customer. The determinants are:

- *Tangibles* like facilities, machinery and personnel.
- *Reliability* of the service provider; to what extent are promised service accurately delivered.
- *Responsiveness* is the willingness to help the customer and provide the service quickly.
- *Assurance* is the extent to which the organisation recognizes knowledge and politeness of the personnel as key elements and in how far the personnel accomplishes to pass trust on to the customer.
- *Empathy* measures whether the organisation cares for the customer and the attentiveness with which this is done.

A measure of tangibles can, for example, be 'the drinking water tasted pleasant', and for responsiveness it could be 'the company responded quickly to my complaint'.

It is assumed, though the subject of debate, that essentially any service can be assessed in terms of the five factors and that they are universal. The model uses three questionnaires with 22 questions to determine the relative importance that respondents ascribe to the aspects under review (Boonyaudomsart, 1995). The first two questionnaires measure the respondents expectations, while the third one maps the respondent's perception. The respondent is asked to answer to what extent he agrees or disagrees with the question (for example using a Likert scale, as shown on

page 50). In addition, the respondent is asked to depict the importance of the quality dimension.

Pros and cons
Buttle (1996) and Smith (1995) criticize the method's reliability and validity. Moreover, it is suggested that the five factor structure is over elaborate and a two factor model would be sufficient. On the contrary, other sources (a.o. Cronin & Taylor, 1994; De Vries and Van Helsdingen, 2005) report that the dimensions of quality vary per sector and therefore in some sectors may exceed the five that are described. Another point of criticism is that some service attributes may have large gaps, but are not considered of relevance to the consumer. That satisfaction does not necessarily imply quality can be seen from the example of a fast-food restaurant where people can consume food with relative satisfaction, without having consumed high quality food or having received high quality service. Apparently people do not always choose for the highest quality, but rather base their choice on aspects such as ease, price or availability - things that do not, or to a lesser extent, influence the quality of the service.

SERVPERF is another, more advanced form of gap analysis, based on the assumptions that perceived service quality is a form of attitude, whereas satisfaction is a way to measure a transaction. Satisfaction is seen as an antecedent of service quality. SERVPERF, in contrast to SERVQUAL, does not measure expectations, it directly measures the quality of the provision of service by measuring the perception (performance) of the customer and the importance on the five SERVQUAL quality dimensions. Data are gathered by means of personal interviews, also using Likert-scale questionnaires.

SERVQUAL defines service quality as performance minus expectations, whereas SERVPERF defines service quality as a function of importance and performance.

The proposed method consists of several steps or components. All research should be well embedded in the specific situation that the consumers under investigation are a part of. Therefore, a qualitative study on the characteristics of the drinking water sector, specifically with regard to consumer issues, is to precede all other research steps. After having described the issues at hand, the steps to be undertaken for the identification and valuation of consumer preferences for drinking water services are:

3.3 Assessing preferences

Consumers' preferences specify in more detail their needs. Preferences are an individual's offset between benefits and costs and are expressed when a person is willing to give up something (cost) to receive something else (benefit). Preferences are not only *what* people want (attributes, choices) but also about the *priorities* they have in mind for it. By measuring how much an individual is willing to pay for a stated good or service, their preferences are assumed to be revealed. Willingness to pay (WTP) techniques elicit

individuals' money valuations of costs and benefits, in other words the amount of money they are willing to pay to gain or avoid something. Similar techniques are used for measurement of willingness to accept (WTA, section 3.4.2). The following description of WTP methods also accounts for WTA.

3.3.1 Methods to measure WTP

Bateman et al (2002) provide a useful overview of approaches for the economic valuation of goods and services (see Figure 6).

WTP methods have evolved from econometrics and assume that human values can ultimately be represented in monetary terms. Thus the usual outcome of a WTP study is an assessment, expressed in Euros or Dollars etc., of the amount consumers are prepared to pay for a good with a specified set of attributes. Use values refer to the WTP for the actual, planned or possible use of a good (e.g. a visit to a national park). Non-use value (NUV or passive-use value) is the value people put on a good or impact even though there is no actual, planned, or possible use of the good. Examples are the preservation of threatened species, or the preservation of the environment to ensure safe and sufficient sources for future generations. NUV is important when the object or impact being valued has few substitutes.

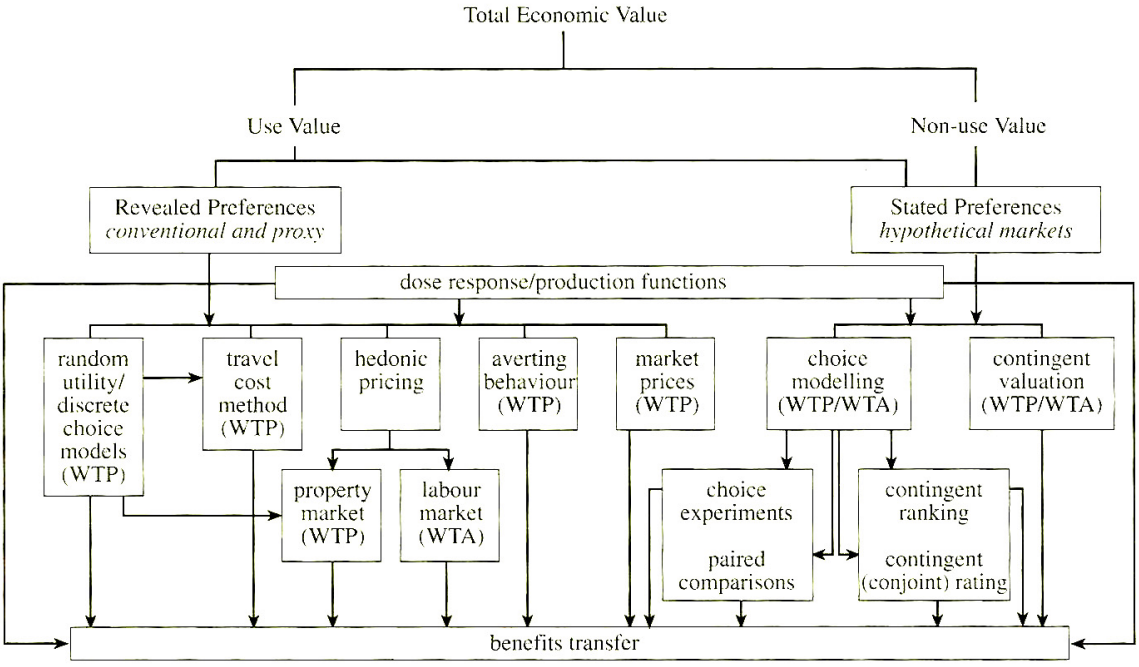


Figure 6 Economic valuation techniques [Source: Bateman et al., 2002, p. 30]

The methods available for investigating preferences can be roughly categorized in two main approaches: 1) revealed preference methods and 2) stated preference methods. A third way of gathering information about the WTP in a site that was found in the literature is benefits transfer (BT). This approach involves taking information about benefits from one site (the study

site) and applying it to another context (the policy site). Because of obvious reliability problems this approach comprises, BT is not considered in further detail in this report. The RP and SP will be discussed, of which the latter is explained in more detail, as it is the main concern of this report.

Revealed preference methods
Revealed preference (RP) techniques use information generated by the markets related to the product or service under research. It is assumed in economic welfare theory that individuals make choices that yield maximum benefit within the limitations of their resources. Therefore choices actually made in the markets are regarded as revealing people's preferences; the amount of money paid for a good or service is at least the amount the person who bought it was willing to pay for it. For example, if the price of a bottle of mineral water A is increased by 50 percent, some people who previously were willing to pay for it, will not buy that particular water anymore. Decreased sales are regarded as a consequence of high prices exceeding customers' WTP.

It should be noted that RP techniques can only be used in circumstances where the good already exists and is freely available in the market place. In case of water it is possible to use RP approaches to reveal consumers' WTP for alternatives to tap water, like bottled water or alkaline electrolysed waters, or to map WTP when a supply system has changed at some point in the past (e.g. in the context of enforced price rises). WTP methods are not suitable in situations where the aim is to find out what people would be prepared to pay if a good's characteristics were to change or be different in the future. Where a good to be valued has yet to appear on the market it is referred to as a non-market good.

Stated preference methods
Stated preference (SP) refers to a set of questionnaire-based techniques which seek to discover individuals' preferences. SP techniques become necessary when the WTP information is not available from the market, as is the case for many public goods. For example in areas with a central drinking water supply, the water utility has a natural monopoly position.

NUV (see previous section) can only be investigated with SP. When using SP techniques, the main choice is between choice modeling (CM) and contingent valuation (CV). These approaches generally present respondents with scenarios, which represent different combinations of alternative situations (e.g. different service levels for different prices). The respondent is then asked to choose the most preferred combination. In the next two paragraphs, the two main SP approaches, CV and CM, will be described in more detail. Table 2 presents an overview of the most commonly used CV and CM techniques, which will be explained in more detail in appendices III and IV.

Table 2 Contingent Valuation and Choice Modelling techniques

WTP methods (stated preference technique)	
Contingent Valuation (Section 3.3.2 and appendix III)	Open-ended
	Bidding game
	Payment card
	Single bounded dichotomous choice
	One and a half bounded dichotomous choice
	Double bounded dichotomous choice
	Randomized card sorting procedure
Choice Modelling (Section 3.3.3 and appendix IV)	Choice experiments (CE)
	Contingent ranking (CRK)
	Contingent rating
	Paired comparison

3.3.2 Contingent Valuation (CV)

CV questionnaires are used for eliciting individual's preferences, in monetary terms, for changes in the quantity or quality of a non-market good or service. CV is used when the WTP for a product or service in total is needed. It has been widely used to discover the value people attach to changes in the quantity or quality of environmental goods (Morrison et al, 1996). The method asks individuals to estimate how much they are willing to pay for having or avoiding the change in question. This requires serious thinking about the topic on behalf of the respondents. Asking people directly what they are willing to pay for something may encounter cognitive problems. It requires people to independently place the subject in perspective both of the alternatives available and of the context of all other demands on their financial means. When a person does not understand the questions, their answer could be unrealistic and not representative for their personal situation. They might for example say that they are prepared to pay a certain amount that is way above their available resources.

In order to make a well founded decision on their monetary valuation it is necessary that the respondents are provided with sufficient information on the topic and choices available. The questionnaire design should take this into account and requires close attention to terminology, format, content and organization to elicit accurate information. The proposed scenarios and questions should be uniformly, correctly and easily understood by respondents and should encourage them to answer in a considered and truthful manner (Mitchell and Carson, 1989).

There are several formats to elicit WTP by means of CV (Bateman et al 2002):

- open-ended,
- bidding game,
- payment card,
- single bounded dichotomous choice,
- one and a half bounded dichotomous choice,
- double bounded dichotomous choice, and
- randomized card sorting procedure.

A brief explanation of each of the above mentioned formats is given in appendix III.

The design of a CV questionnaire comprises of three interrelated stages (Bateman et al , 2002; Morrison et al, 1996):

1. Formulating the valuation problem
   Identification of the good being valued, constructing the valuation scenario and eliciting monetary values.
2. Additional questions
   Debriefing and follow-up questions about attitudes, opinions, knowledge, familiarity and use of the good and demographics.
3. Pre-testing the questionnaire
   Pre-testing the questionnaire for content, question wording, question format and overall structure and layout and then revising the design based on the pre-test findings. Forms in which the pre-test can take place are focus-groups, one-to-one interviews, verbal protocols or pilot surveys.

Pros and cons

CV is used to elicit the WTP for a product or service *in total*. One criticism often stressed is that assigning an amount to a proposed change in a good or service is a cognitively demanding task for the respondent. The fact that CV generally regards only one aspect makes it difficult for people to autonomously place it in a wider context (and thereby make a realistic estimate of the amount they are willing and able to pay). This often result in 'hypothetical bias', which is the occasion where the stated WTP is higher than the actual WTP. Analysis of combined studies suggests that CV produces, on average, WTP values just below those of RP techniques however, RP techniques cannot identify option and non-use values. SP techniques are the most widely used method for valuing non-market impacts in cost benefit analysis. SP will typically be chosen over RP because it provides for the inclusion of non-use values, and the necessary data may not be available for revealed preference techniques.

3.3.3 Choice Modelling (CM)

CM is a set of SP techniques in which respondents choose their preferred resource use option from a number of alternatives. In CV the number of scenarios that can be considered in one study is limited, therefore, CM is the

preferred method when searching for the value of individual attributes of a product or service. The method can clarify which attributes are determinants of the values people place on non-market goods. It does so by presenting respondents a hypothetical setting and asking them to choose their preferred choice set of alternatives (different levels of attributes). The use of CM approaches to elicit preferences is more recent and thus less tested and described in the literature compared to CV.

CM can best be applied when the WTP for individual attributes of a product or service is required. It is useful when information is needed on relative values for different characteristics or attributes of a non-market good. Marginal changes in the level of these attributes can be built in, which can be relevant for investment decisions. For example:

- changing the number of water supply interruptions per year;
- changes in the time a customer has to wait before his phone call is answered;
- changes in the frequency the supplied water is discoloured

One example of a CM study to assess WTP for improvements in water services can be found in Vietnam (Nam & Son, 2004). The study assesses the WTP of people in Ho Chi Minh City to pay for improvements in their water system. It also investigates what aspects of water supply, such as quality and pressure, are considered most important with the purpose of water supply planning.

A sample survey was conducted among Ho Chi Minh City households in which they were informed that it would be possible to connect to, and use, a piped water service, in which case they would pay a higher monthly water bill. The attributes and the levels presented to the respondents resulted from two focus group discussions and a pre-test of 47 sample households. In the focus group discussions to determine the attributes, the following issues were addressed according to Blamey et al (1998):

- definition of attributes,
- number of levels for an attribute,
- levels of monetary attributes,
- wordings, and
- the impact of photographs

The attributes that turned out to be important were water quality, water pressure and monthly water bill. Respondents were given a clear explanation of the attributes and their levels and they were presented with four choice sets showing various options (see Figure 7). Four choice sets, each containing three attributes with two levels each results in $4 * 2^3 = 32$ choice sets in total.

CM is based on the assumption that any good can be described in terms of it's attributes or characteristics and the levels that these take and includes the following techniques;

- Choice experiments (CE)
- Contingent ranking (CRK)
- Contingent rating
- Paired comparison

These techniques are also sometimes known as 'conjoint analysis'. Not all four CM methods are consistent with underlying welfare theory. Choice experiments (or, to a lesser extent, contingent ranking) are usually preferred over contingent rating and paired comparison if estimates are needed that are consistent with welfare theory. Considerate choice of wording and interview design can make contingent rating and paired comparison in correspondence with welfare theory as well, although this requires extra attention. In appendix IV the techniques are exemplified.

The design of a CM questionnaire comprises, like the design of a CV questionnaire, of three interrelated stages (p. 44); formulating the valuation problem, additional questions and pre-testing the questionnaire.

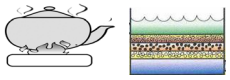
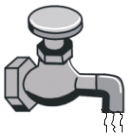
	Connection	**Status quo**
Water quality	 (Drink straight from tap – high quality)	 (Boil and filter before drink – low quality)
Water pressure	 (Strong pressure)	 (Low pressure)
Total household monthly water bill	140,000 dong	40,000 dong
CHOOSE ONLY ONE ⇒	☐	☐

Figure 7 Example of a CM choice set [Source: Nam & Sun 2004]

Pros and cons
CM is said to be easier to understand and put in perspective because it does not explicitly ask people how much they are willing to pay for something. CM generally results in higher responses per individual and is therefore said

to be a more efficient means of sampling than CV. However, with regard to hypothetical bias (i.e. actual WTP being less than stated WTP) there is no reason to suppose that CM is better than CV.

The advantage of being able to present respondents with multiple attribute combinations (and thereby gain higher responses per individual) can become a disadvantage when too many options are combined in one scenario. When presented with complex alternatives to weigh against each other, respondents may not understand the questions which can lead to them failing to complete all parts of the questionnaire. The failure in understanding can be worsened by respondent fatigue, caused by the exposure to many combinations. Optimal results are said to be accomplished with six attributes or less to avoid overload problems.

3.3.4 Limitations of WTP Stated Preference Techniques

WTP studies have an appeal since they can form a major part of a larger cost benefit analysis that allows service providers to design their services/products to best match consumer preferences knowing that consumers are likely to be willing to pay for them. They can avoid the situation where a desirable product is created but its costs exceed the likely amounts consumers are willing to pay to receive them.

In the foregoing, different types of biases were identified. Pearce & Özdemiroglu (2002) present a clear overview in their summary guide to stated preferences of possible types of biases, their nature, effects and solutions.

Besides the methodological limitations already discussed, one practical issue that may form an objection to the SP method should be noted. Much of the literature critical of WTP studies questions this latter assumption (e.g. Merrett, 2002) and many studies show evidence of participants engaging in strategic responding and misrepresenting their WTP values in the hope of lowering the eventual price of a good. WTP studies also raise ethical questions (e.g. Whittington, 2003). Particularly in the developing world where participants are not used to social research participants may feel under pressure to respond in certain ways believing, for example, that their responses will be made known to the authorities. Also, people may have difficulties understanding the scenarios or have cognitive limitations that prevent them from forming and stating their 'true' WTP.

Moreover, it is assumed that people have real, fixed values for products/services that can be accessed and that these are sufficiently stable to permit policy planning to be based on them. Valuing a single product is a complex task requiring the respondent to consider the value they place on the product in monetary terms (they may never have done this in the past in the case of water for instance) and to compare this to other things that they value and want to purchase whilst simultaneously considering their total available financial resources. It is assumed that the consumer will act rationally to

maximise the value that could be obtained from their resources. It is unclear though, how, and indeed whether, people weigh competing demands on their resources and thus construct values in the ways implied by economic welfare theory which underpins WTP and WTA studies. When considering valuation in the context of policy options the assumption that option values can be expressed in monetary terms and can be compared and traded off against one another is often challenged (Stagl, 2007). Moral choices can conflict with and often override economic choices. For instance, trading children, drugs and weapons are considered by many to be fundamentally inappropriate options, not merely ones with a low monetary value.Alternative approaches to include assessments of public preferences in policy making (Stagl, 2007) are discussed briefly in appendix V.

It should also be noted that WTP studies while very useful are always context specific and so extracting generalisations from WTP studies can be problematic. Thus for any given context fresh WTP studies are called for especially as monetary values will change overtime as a function of factors such as inflation and the presence of new alternative options.

3.3.5 Unity-sum-gain-technique

A technique that is often used in market research is the unity-sum-gain-technique. It is used for evaluating the options which are likely to prove successful with the introduction of new products and might prove useful for eliciting consumer preferences for service attributes as well.

The respondents are presented with a list of attributes which might possibly be offered as services. Alongside the attributes the costs, or an index representing the relative costs is listed. The respondents are told that they have a fixed amount to spend and they are free to choose on which attributes they prefer to spend it. They are also told that any unspent money cannot be retained and that the best value-for-money should be sought. The researcher can ask the respondents to make clear which principles underlie their decisions to elicit the criteria that they consider important.

Pros and cons

In cases where specific prices are used, this might introduce some form of bias into the results. Using an index instead of prices is then a better option. Even with this simplification however, this technique can only be used in cases where people are involved with the product or service, because it is a rather demanding task that is requested. The reasoning behind the choices made contain a lot of information that is interesting to the researcher, however is difficult to structure and analyse by this means.

3.4 Assessing acceptance

Measuring acceptance is useful to determine the lower limits of what people would tolerate from their water company. It clarifies the boundaries beneath which the provided service is evaluated as dissatisfactory. It thus also gives

information about the range in levels of service provision that the water company can get away with.

In the introduction it was already mentioned that levels of involvement can affect the level of motivation to participate in processing and using information to make choices, which is eventually believed to affect the response to the questions asked (Abley, 2000). Eliciting preferences for low-involvement products will therefore put a higher demand on the set up and conduct of interviews. The common method to measure acceptance is Willingnes To Accept (WTA). WTA uses similar techniques to measure what people are willing to tolerate as Willingness To Pay (WTP) uses to measure what people are willing to pay and to elicit preferences (section 3.3).

3.4.1 Questionnaires and interviews

To measure people's feelings, attitudes, opinions, and evaluations common practice is to present them with questionnaires or conduct interviews. The design can vary from survey questions to unstructured interviews and everything in between. Less structure in the questions and possible answers means a more elaborate and difficult task in the preparation and analysis of the results. Measurement of consumers' acceptance can be done using comparative or non-comparative scales. Comparative scales are often used to find out which are the most important factors of a product or service. In comparative scaling, the respondent is asked to compare one product or attribute against another. An example of this is paired comparison, a technique where the respondent is asked to choose between the (least) preferred of two situations. Non-comparative scaling is used to evaluate a single product or attribute. Different types of scales are available to the researcher, among the most frequently used are: continuous rating scales, semantic scales (see Figure 8) and Likert scales (see Figure 9).

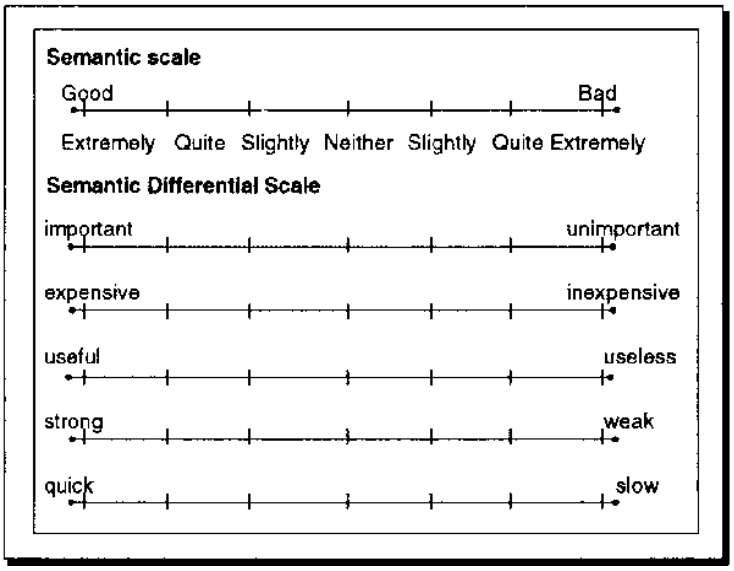


Figure 8 Example of semantic (differential) scales [Source: http://www.fao.org/docrep/W3241E/w3241e04.htm#levels%20of%20measurement]

	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Without government regulation water utilities would exploit the consumer.	**1**	**2**	**3**	**4**	**5**
Most water companies are so concerned about making profits they do not care about quality.	**1**	**2**	**3**	**4**	**5**

Figure 9 Example of a Likert-scale

3.4.2 Willingness to Accept (WTA)

WTA studies are generally surveys about respondents' willingness to receive money for lower service levels. It is based on the assumption that money is the standard to measure value. WTA expresses what amount of money people are willing to accept to compensate the loss of a benefit. Related to this is the concept of WTP, which is explained in greater detail in section 3.3.1.

WTP and WTA are based on the assumptions underlying economic welfare theory. In the theory of welfare economics, in a competitive economy in any state of equilibrium, resources are allocated in a way that no further gains of economic efficiency are possible. Also, in a perfect market situation, each person increases economic efficiency by acting in accordance with his or her preferences, thereby maximizing personal benefits. In situations other than markets or private consumption goods, WTP and WTA can also be used, if it is reasonable to assume that individual's preferences are adequately comprehensive, stable and coherent. This means individuals have to be able to make meaningful preference comparisons between costs and benefits, the preferences must not vary arbitrarily over time and must be internally consistent for any individual. In economics, it is usually presumed that these assumptions hold.

Methods to measure WTA are similar to those for WTP. Although the content obviously differs, the questions are normally dealt with in the same way as WTP studies (see section 3.3.1).

Pros and cons

One advantage of the WTA method is that is uses money to express the value individuals assign to (missing) certain service attributes. This makes it easy to compare with values of (changes in) products and services in a market. A disadvantage directly related to this, is that people may not only choose on one value dimension (i.e. money) alone. For example, it is very likely that moral choices can conflict with and override economic choices (Fife-Schaw et al, 2007).

Another advantage of using economic welfare theory is that the outcome can be used for Cost Benefit Analysis which is often used for policy making in situations where markets do not exist, or where they fail to generate economic efficiency. This means that although there is no perfect market situation in the

case of tap water, it is still possible to find out what the public is willing to accept and use this for policy making (for additional information see appendix V). However, the usefulness of the outcome of WTA studies for policy making is doubtful, as it is uncertain whether people weigh competing demands on their resources and thus construct values in the ways implied by economic welfare theory which underpins WTA and WTP studies. Although the absolute value of WTA studies is unlikely to be of use for policymakers , comparison of the relative magnitude of scales can give insight in the relative importance the publics adhere to product or process attributes.

Methodological issues and the related pros and cons are discussed in more detail in section 3.3.1.

3.4.3 Latitude of Acceptance (LA)

Considering the fact that water is a low-involvement product, people can generally be expected to have non-crystallised attitudes about it. In cases where people do not have a particular attitude, it is important this non-attitude is detected, rather than neglected. To ensure that valid attitudes, as well as non-attitudes are measured, the Latitude of Acceptance (LA) scale can be used. In the LA approach people are asked about various service-attributes what they consider absolutely acceptable and absolutely unacceptable. Respondents can also express a 'grey area', a range of intermediately acceptable attributes that they can cope with. An example of this can be found in research by CSIRO in Australia (Po et al, 2002). The research aimed to develop a method for assessing customer preferences for the service level with regard to water supply interruptions. In the study the latitude of acceptance was examined for three aspects of supply interruptions: the timing, duration and number of interruptions. Respondents were given six different time periods and were asked to indicate whether they could, or could not, cope with the water interruptions, or whether the period lay somewhere in between in terms of acceptability (the grey area). The questions were posed as represented below. The result of what people consider most and least acceptable is portrayed in Figure 10.

Q: At what time in weekdays would your household be able to cope with water interruptions?

→ Tick (√) those that you absolutely **could cope with**
Cross (X) those that you absolutely **could NOT cope with**
Leave blank those that are somewhere in between

Time in weekdays					
6 AM - 9 AM	9 AM - 12 PM	12 PM – 2 PM	2 PM – 5 PM	5 PM – 10 PM	10 PM – 6 AM

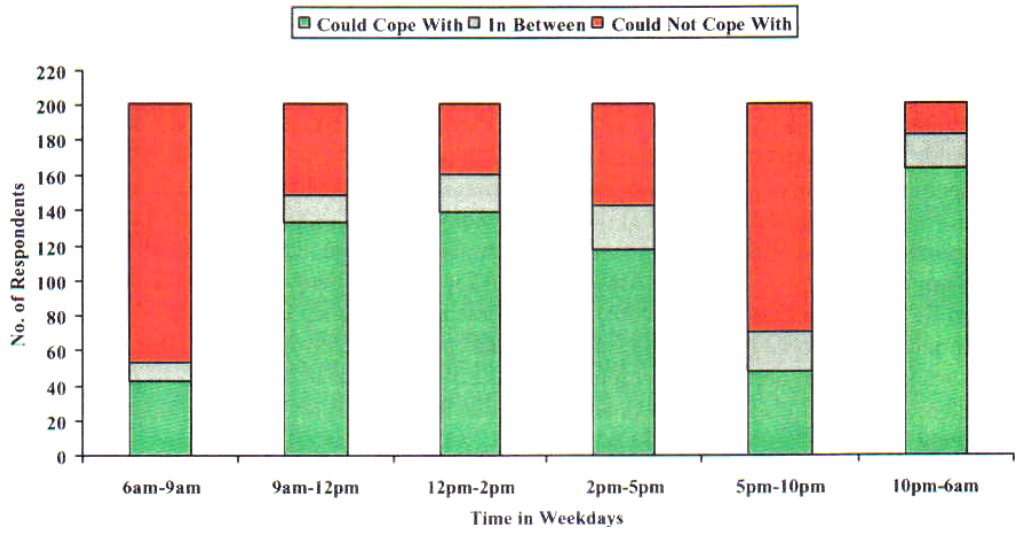


Figure 10 Distribution of respondent's acceptance for the time of interruptions on weekdays [Source: Po et al 2002, p.62]

Similarly, respondents were asked to nominate the duration of interruptions their households could absolutely cope with, could absolutely not cope with, or lay somewhere in between. The distribution of what the respondents did and did not consider acceptable is shown in Figure 11. This demonstrates that the duration of interruptions increases, the number of people who are willing to accept the interruption decreases. In practice this means, that the satisfaction decreases as duration increases.

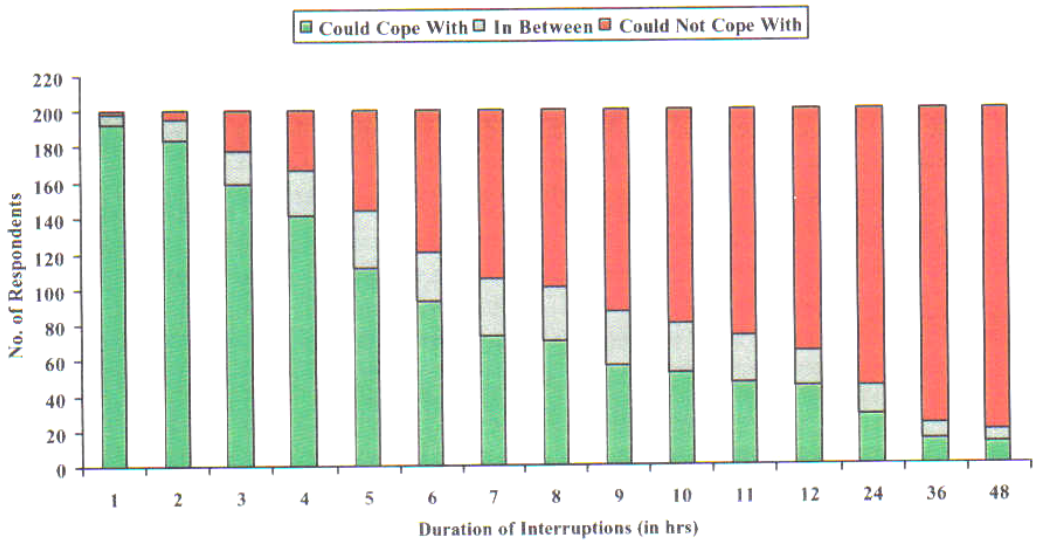


Figure 11 Distribution of respondent's acceptance for the duration of interruptions [Source: Po et al 2002, p. 65]

Pros and cons

An advantage of the LA approach is that it gives some idea of the range of acceptable service interruptions. It also gives respondents an opportunity to

depict in a more natural way where their boundaries of acceptance lay than when they are forced to 'accept' or 'decline' and there is nothing in between. The result is thus more realistic.

The downside of this approach is that it seems specific to service attributes which have clear numerical values associated with them and it seems less useful when the attribute concerned is qualitative.

3.5 Conclusion: a selected method for preferences assessment

Different approaches to assess consumer preferences, acceptance and satisfaction are available to water utilities. Which consumer research technique is appropriate for consumer research depends not only on the purpose of the research, but also on the available resources. If more detailed research is feasible, several approaches can be combined.

One example of a successful combination of approaches is a CSIRO study by Hatton MacDonald et al (2002) investigating water supply interruption preferences. Despite the fact that this particular study only focuses on water supply interruptions, the methodology comprises tools that also can be used to assess customer preferences and willingness to pay for various other drinking water services.

From the CSIRO methodology four research steps can be abstracted to form an assessment method for the identification and valuation of consumer preferences, that is appropriate for use by other water companies:

1. Focus groups with consumers to identify which service attributes they consider relevant. The identified attributes serve as input for the next step.
2. Determination of whether consumers perceive a discontinuity between the level of service provided for the previously depicted attribute(s) and the investments made to provide that service (to detect over- and underservicing). This is elicited by means of the Subjective Social Indicator technique.
3. Valuation of levels of the relevant product or service attributes that customers 'could cope with' by nomination through a Latitude of Acceptance scale. This results in threshold levels of acceptable service.
4. Valuation of the amount of money consumers are willing to pay for their preferred service level(s) by means of a Choice Modelling questionnaire, thereby revealing their preferences and accompanying threshold levels.

It should be noted that all research steps should be well embedded in the specific situation that the consumers under investigation are a part of. Therefore, a qualitative study on the characteristics of the drinking water sector, specifically with regard to consumer issues, is to precede all other research steps.

4 Findings from the international drinking water consumer literature

4.1 Consumers' satisfaction

A recent survey of European consumer responses to the major utilities (Candidate Countries Eurobarometer, 2003) shows that satisfaction with water supplies is high compared with most other utilities with only postal services performing better over a range of service features (price, quality, access, contract conditions etc.). Across all countries (old EU15 and new accession countries) the quality of water supplies is rated at 3.31 (new states) and 3.26 (old EU15) on a 4 point scale where 4 indicated 'very good'. Only 1% of all EU citizens regarded the quality as 1, 'very poor'. Across the whole of the EU 90% are satisfied with the quality of the water they receive. Levels of satisfaction were particularly low, however, in Latvia, Lithuania and Estonia with between 18% and 23% of the populations of these countries feeling that the quality of their supplies was 'bad' or 'very bad'. People in these countries (and Slovakia) were the least happy with customer services provided by suppliers with Cypriots and the Maltese being happiest with them.

Turgeon *et al* (2004) argue that drinking water quality satisfaction and risk perception are closely related. Their study, carried out in Quebec, demonstrated that consumers are able to perceive known variations in water quality, and that variations in water quality and geographical location have a strong impact on consumer perceptions and satisfaction. Consumers' perceptions of drinking water risk result from a combination of objective information together with a combination of social, cultural and psychological factors. Other factors, such as an aging population also may influence risk tolerance in a society since perceptions of risk are known to vary with age (Means, 2002). Risk perception amongst consumers who live nearer a water treatment plant tends to be high, whilst satisfaction levels are lower than people living further away from the plant (Turgeon, *et al* 2004).

Dissatisfaction may not only emanate from service attributes, but also from lack of communication. Fessenden-Raden *et al* (1987) suggested that customer dissatisfaction with drinking water may be due in part to the lack of effective communication by water company experts during water pollution incidents, such as chemical contamination of groundwater.

Given these findings on satisfaction, (risk) perception and communication we now turn to look at specific preferences, willingness to accept and willingness to pay.

4.2 Consumers' preferences

4.2.1 Water quality and safety

It will come as no surprise that most studies show that consumers' primary expectation is that their supplier will provide safe, clean drinking water (Bates, 2000). Burn, Tucker, Rahilly *et al* (2003) for example found that in the context of water companies' management of Australia's state water resources, the main priorities set by the consumers were, a) quality of water supply and b) continuity of water supply. In the UK, the Consumer Council for Water (2005) conducted a series of focus groups in order to explore which water supply issues affected consumers the most. They regarded the key responsibilities of water and sewerage companies to be:

a) supply of clean water (often mentioned as the most important issue);
b) reliable service (involving continuous uninterrupted supply, efficient sewerage services, and effective customer services);
c) value for money.

Research carried out by the UK's Drinking Water Inspectorate also explored consumer preferences and issues of concern about drinking water. They found that consumers prioritised safe clean drinking water before reliability of supply (DWI, Consumer Consultation, 1998).

In all studies we have seen that ask consumers about expectations and break these down into specific aspects of the supply, safety always features strongly. What is less clear is precisely what 'safety' means to consumers. General research on perceptions of risk and the notion of uncertainty suggests that consumers would prefer the services provided to them to be 100% safe and present them with no probability whatsoever of experiencing harm in either the short or the long term. The idea that there is always some residual probability of harm from any system, however, small is not always acknowledged and it is not clear that this is because consumers really do not acknowledge this or, more likely, the way the studies have been conducted has not been conducive to exploring these issues.

Consumers undoubtedly *prefer* water supplies that are 100% safe but what is currently unclear is what proportion of the population accept some uncertainty and thus *expect* less than 100% safety, and what levels of risk are *acceptable* to which sets of consumers. Frewer, Miles and Brennan *et al.* (2002) found uncertainties related to the knowledge limitations of science to be more acceptable than those stemming from government regulatory activity – or lack of it. This is an under-researched area but is a topic which is beginning to be addressed in the willingness-to-pay literature.

4.2.2 Water quality – taste and odour and other aesthetic aspects

Immediate sensory perceptions of tap water are most likely to govern levels of concern, satisfaction and trust in the water supply (in the sense of confidence in its quality and safety). In general, research suggests that

European consumers are relatively satisfied with their tap water. For example, the UK's Drinking Water Inspectorate (DWI, 2000) demonstrated that most respondents were relatively satisfied with their drinking water. Similarly, Dutch research has demonstrated that consumers are not particularly concerned about water quality issues (Martijn, de Rooy & Piriou, 1998) and this seems to be a general finding across the EU (Candidate Countries Eurobarometer, 2003).

In cases where consumers have expressed concern or dissatisfaction it is clear that these concerns emanate from two sources. In the UK Drinking Water Inspectorate's study (DWI, 2000), concerns were firstly related to the physical properties of water - such as taste and odour, appearance, hardness, freshness and temperature, and secondly in relation to the composition and/or the source of the water. Here, concerns were often expressed as questions and doubts about:

- What drinking water contained (both 'natural' ingredients and any additives).
- What was done to the water before it arrived at their taps.
- Where it came from (for example, was it recycled waste water?).

Studies have found that concern tends to be raised when the physical qualities of water differ from the norm (e.g. Martijn, de Rooy & Piriou, 1998). Consumers' sensory perceptions of their water are quite well tuned (cf. Falahee & MacRae, 1995) and thus aesthetic estimations of tap water quality (e.g. taste and odour and colour) will have an impact upon judgements of apparent quality and safety. Taste and odour while being interlinked, tend to relate to different factors, with the sense of taste being most attuned to the inorganic constituents of water, with the sense of smell relating more to organic constituents of water (Health Canada, 1995; WHO, 1997). Much lower concentrations of substances can be detected by odour than can by taste, with taste, odour and temperature all contributing to complex sensation of flavour (Health Canada, 1995).

Studies have also shown that chlorine is not effective at masking the odours in drinking water, such as the earthy or musty odours that result from the presence of geosmin or 2-methylisoborneol in drinking water (Oestman *et al*, 2004). Chlorine odour itself is of particular concern to consumers (CSIRO Land and Water, 1999). The taste of chlorine in tap water is a leading cause of customer complaints and dissatisfaction with drinking water although perceptions are influenced by the chlorine practices of the customers' country of residence (Piriou, *et al*, 2004).

The residual level of chlorine in water has been correlated with increased consumer dissatisfaction with water quality and an increased perception of risk associated with drinking water (Turgeon, *et al*, 2004). This perception occurs despite the fact that the real health risk associated with drinking water may be inversely proportional to the residual level of chlorine in tap water, with chlorine levels decreasing with increasing residence time of water in the distribution system and the distance from the water treatment plant. Turgeon

et al (2004) also found that socio-economic factors influenced satisfaction with drinking water quality, with younger respondents, those on lower incomes, and those without university education more likely to be satisfied with their drinking water supply.

McGuire (1995) reported that, if consumers detect an 'off-flavour' in their drinking water, they are likely to believe that it is unsafe to drink. Thus changes in the system and/or water source can have a large impact upon perceived water quality and resultant levels of expressed concern. Owen *et al* (1999), for example, describe an incident where a water company in the south east of England changed one local water supply source and subsequently many customers noticed the change and called the company for information. It transpired that consumers had detected the change in water supply by seeing deposits in kettles and 'scum' on the surface of hot drinks. However, due to the company staff being ill prepared to deal with questions about the source change, some customers became suspicious which in turn lead to beliefs that the water was harmful even though it met all extant safety standards. This is a case of consumer complaints/enquiries not being dealt with efficiently leaving doubts in consumers' minds about the trustworthiness of their supplier and supplies.

Changes to the water system may thus have an impact upon perceptions and behaviour. Biswas, Jayatilaka & Tortajada (2005) carried out research in Colombo, Sri Lanka, where nine towns near Colombo had recently gained potable piped water as part of a programme to fulfil the Millennium Development Goals. However, inhabitants continued to use polluted well water for drinking and cooking purposes, while using the piped water for bathing and washing. Inhabitants judged the water according to physical characteristics, such as taste and odour and colour. It was found that the underlying basis for their behaviour was the disliked chlorine odour of the piped water. Furthermore, in addition to not drinking the new 'clean' water, after the introduction of the pipes, more people complained about their health, suggesting heightened levels of perceived risk in response to the change. Changes in taste and odour not surprisingly provide a signal and act as a warning that care should be taken.

Sensory perceptions of tap water which may or may not relate to the underlying quality or safety of the water, can lead to modifications in behaviour and in some cases individuals may seek alternative sources. For example, in the DWI (2000) study some participants who felt concerned about the physical properties of their tap water modified their behaviour by filtering their tap water before drinking it. Others opted not to drink the water at all on the grounds that it looked, smelt or tasted unpleasant.

Many studies find that consumption of filtered or bottled water reflects aesthetic preferences (e.g. taste and odour) rather than overt concern for risks associated with tap water (DEFRA, 2002; IFEN, 2000; Means *et al*, 2001; DWI, 2000), although some studies (Doria, 2006; Dupont, 2005) find both aesthetic preferences and health concerns can lead consumers to opt for bottled water,

with consumer trust in the water company also influencing consumption choices. Some consumption of bottled water may also occur because of consumer preferences for water that is chilled or sparkling. Certainly the growth in bottled water consumption in developed countries is largely independent of objective tap water quality (UNDESA, 2006). A survey of 1846 people across England and Wales found that, compared with the risk of consuming food items such as chicken and beef, drinking tap water was perceived to be of low risk (DWI, 2000). The study found that 69% of respondents were satisfied with their tap water quality. The main reasons cited for dissatisfaction were related to aesthetic qualities of the water. Eighty-six percent of those surveyed said they regularly drank tap water, whilst only 6% drank bottled water only. Here, bottled water consumption was attributed to a dislike of the taste and odour of tap water.

Consumers have a finely attuned sense of taste where water is concerned. Falahee & MacRae (1995) carried out a study using untrained members of the public to evaluate preferences for different types of drinking water. They found that bottled waters were preferred to distilled or tap waters by the majority of assessors, with waters of higher mineral content being preferred. Similarly Koseki and colleagues (Koseki, Nakagawa, Tanaka, Noguchi, & Omochi, 2003; Koseki, Fujiki, Tanaka, Noguchi, & Nishikawa, 2005) found clear preferences for alkaline electrolysed waters over tap waters (and, indeed, some bottled waters). These kinds of findings lend some credence to consumers' claims to be choosing bottled waters because they can taste the difference.

In slight contrast to the above, a survey conducted amongst 400 residents of Georgia, USA (Adote Abrahams, Hubbell, & Jordan, 2000) found that consumers who were dissatisfied with the taste, odour, and/or appearance of tap water were willing to pay for bottled water but claimed that they were also doing so to avoid health risks from tap water. These authors found that use of water filters tends to be higher amongst consumers who had experienced problems with their municipal tap water. People who felt their water was 'unsafe' were also more likely to use treatment devices, whereas the aesthetic qualities of water did not feature as significant determinants of use of these devices though they were significant in the case of bottled water use. They state that the use of water filters is an averting behaviour undertaken to reduce the risks associated with drinking tap water. Bottled water use in this study seems to be both a risk avoiding and taste enhancing behaviour.

4.2.3 Water pricing and metering

In this section we are concerned with general consumer responses to pricing issues.

Surveys of the concerns of the European citizenry such as the Eurobarometer surveys suggest that the majority of consumers regard the price of their water supplies (including waste water services) as 'fair' which is second highest

degree of satisfaction with utility prices after postal services. Only 8% of EU15 citizens regard water prices as 'excessive' with the figure being higher at 17% among new accession countries (Candidate Countries Eurobarometer, 2003). As is the case for all questions of service pricing those who regard prices as excessive are those who are generally least able to afford to pay their bills (e.g. the unemployed, the old, manual workers) so the figures of those regarding prices as 'excessive' probably reflects low ability to pay rather than a negative response to water prices specifically.

In the case of the fully privatised supply system in the UK, participants in the study conducted by the Consumer Council for Water (2005) raised concerns about fairness and perceived lack of clarity in terms of charges. Many found it difficult to reconcile the large differences in charges paid for water and sewerage services according to where people lived. Issues of water charging were also mentioned on a larger-scale, national basis according to perceived differences in the quality and cost of services between water companies across England and Wales. There was an understanding amongst consumers that there should be "equitable provision and that customers should not be penalised according to where they live" (Consumer Council for Water, 2005). This reflects a common theme in the literature that water is an essential natural product that should be readily available to all irrespective of their circumstances.

There remains quite a bit of residual disquiet about the profits of the UK's privatised suppliers particularly as prices are seen to be rising above the rate of inflation and supplies are threatened by both drought and leakages leading to hosepipe bans and calls to save water (Consumer Council for Water, 2006a). Complaints about water supplies rose 11% during 2005-6 with the biggest category of complaint being about billing (36.2% of all complaints).

Many European consumers are charged for their water via the use of a meter and in general water metering is seen as desirable for the implementation of efficient water pricing policies and encouraging conservation (OECD, 2003). The installation of meters normally has an impact on consumption though this is not usually even across all sectors of any given society. For example Ochoa, *et al*, (1990) found that while responses to new meters were generally positive in their Mexican sample middle income groups made the greatest savings over the trial period. Similarly differing pricing structures provide incentives for different levels of conservation behaviour and occasionally, as in the case of Japan recently, consumption can be so reduced that revenues from water charges drop substantially.

Whether metering is seen as desirable largely depends on the prevailing culture and metering history. In The Netherlands, France and Germany where there is a relatively long history of metering it is accepted as a reasonable way to charge for water. In the UK metering is as yet not widespread. Whilst many were happy to have saved money using meters, non-users were concerned that "'paying for what you use' might mean paying more than charges based on rateable value". In general, people said

that they wanted to know more about the potential benefits and savings associated with metering. Participants were often unaware of how to have a water meter fitted, whether they could have it removed at a later stage and whether they would incur any costs by doing so. This suggests poor communication on behalf of the water industry about water meters since there were generally no charges associated with removing meters. In general customers did express a degree of willingness to have a water meter, since they would "like to be able to better work out how much they would be paying if they were billed for what they use" (Consumer Council for Water, 2005).

In the case of water company profits, UK consumers were concerned that water companies are overly interested in making profits and awarding bonuses to shareholders and 'fat cats'. People regarded this as a conflict of interests between water companies making profits for shareholders and bonuses for board members, and protecting the interests and rights of water consumers. They stated that they would prefer "more of a balance between water companies rewarding themselves, while still offering fair prices, a well maintained infrastructure and good customer services" (Consumer Council for Water, 2005).

4.2.4 *Information about Water Quality and Other Performance Indicators*

Although the idea that suppliers ought to provide information on their performance to consumers is widely supported by consumer groups there is little clarity about what information consumers actually want or whether the indicators deemed relevant by the industry address consumers' information needs. Given that the water supply is rarely a matter of concern for most consumers simply providing information for the sake of it may serve very little purpose and indeed may even create anxieties by making it clear that tap water contains more than merely H_2O (cf. McGregor, Slovic & Morgan, 1994).

Most suppliers define and monitor various indices of performance (e.g. Couibaly and Rodriguez, 2004; Marques and Montiero, 2001) but there is relatively little research on what this information means to consumers. Johnson (2003) reports a study of New Jersey customers who received different versions of a water quality report ranging from a purely qualitative report, through a minimal quantitative one that met USEPA guidelines to a more fulsome quantitative report. The findings suggest that overall assessments of supply quality and supplier performance did not change as a result of receiving the reports although the fulsome quantitative report was slightly more successful at conveying information than the qualitative report. Subsequent questioning of the participants suggested that some had not read the materials particularly carefully and, generally, that prior general beliefs about risks dominated judgements of performance irrespective of the content of the reports.

This could be interpreted as suggesting that consumers do not really want or

understand information on supplier performance but this would probably miss the point. Southern California Water Recycling Projects Initiative, (2004) report a number of cases where provision of timely information has been crucial to the success or otherwise of proposals to change the nature of supplies. The research shows that consumers do want this kind of information but they need it when they want it and they should to be able to get it quickly in a format that can be readily understood.

4.2.5 Complaints as an alternative indicator for preferences

Dissatisfaction as a manifestation of failure to satisfy consumer expectations may be difficult to detect. One obvious method of monitoring public dissatisfaction is to examine levels of customer complaints. Most water companies recognise that customer complaints are an important indicator of customer dissatisfaction and duly monitor them closely. Owen (2000) in her study reported complaints about a variety of issues from quality of water to sources of water, water treatment processes, water distribution networks, domestic plumbing systems and billing. Most consumer complaints are received and handled by their respective water companies in the first instance.

Across the original 15 EU countries 72% of residents report that information given by water suppliers is clear (e.g. billing, contracts, leaflets) the other 28% reported that the information was unclear (18%) or they did not know whether it was clear (10%). Just over 20% of consumers thought their contract with the company was 'unfair' and 2% had lodged a complaint in connection with their water supplier in the previous 12 months. Of those who had complained in the EU15 a full 41% thought that their complaint had been dealt with 'fairly badly' or 'very badly' with the biggest group of these complaints being about billing. The numbers are small here so some caution is required (Candidate Countries Eurobarometer, 2003).

While the rate of complaints to water companies was low at 4% in a study of German consumers (ATT *et al,* 2005) almost 40% of consumers who made a complaint were dissatisfied with the response of the water company. The study found that although German consumers overall had a positive image of their water companies, consumers were less positive when asked whether their water company was too bureaucratic or about the fairness of water prices. In part this may have been due to consumers being ill-informed about water prices as the average price estimated by consumers in the study of approximately €5 per cubic metre was considerably higher than the actual average price of water charged at €1.81.

In the UK, should dissatisfaction still remain after making a complaint - presumably due to an ineffective response by the water company at handling the initial complaint – one avenue for customers to pursue their complaint with the Drinking Water Inspectorate (DWI), the key body for monitoring water quality. In 2001 the DWI received 346 complaints in relation to drinking water quality. In rank order of most complaints, these complaints were

related to discolouration, taste and odour of chlorine, other taste and odour issues, particulates, illness, hardness and lead. The inspectorate reported that most of these complaints were handled by asking the relevant water company to look into the matter and take remedial action where necessary (DWI, 2001).

It is important to note that customer complaints may demonstrate concern about drinking water as well as dissatisfaction with water companies themselves. In their 2001 report the DWI reported that, while most consumers who contacted the inspectorate had a concern about a water quality issue, a growing number involved consumers who were dissatisfied with the way their initial complaints were being handled by some water companies.

It should be noted that complaining rates are an imprecise indicator of the level of consumer dissatisfaction. Some dissatisfied consumers will complain but others will not for various reasons including cynicism about the likelihood of their complaint being dealt with satisfactorily or a personal dislike of complaining in general. Some people are habitual complainers who will complain about any service irrespective of its quality.

4.2.6 Willingness to pay studies

Willingness to Pay (WTP) studies are presented in a separate section here as they reflect studies that share a common conceptual basis. More detailed information about WTP techniques can be found in section 3.3.

For reasons discussed elsewhere in this document bottled water use is a complex purchase behaviour. Bottled waters offer a number of attributes beyond satisfying a need for clean drinking water (e.g. portability and convenience) and thus WTP values placed on it cannot be used in a simple way to place a value on the water itself.

There are a multitude of factors affecting willingness to pay for water services. According to Ntengwe (2004) willingness to pay for water services is affected by existing water quality, affordability and ability to pay, together with consumers' level of awareness of water management issues. The status quo can also have a significant effect on willingness to pay amounts, with consumers generally preferring the status quo over changes in service levels and costs structures (Hensher, 2005).

Raje *et al* (2002) argue that some consumers have a zero willingness to pay more because of a lack of faith in the management system of their water supplier, and only by increasing management transparency and the transparent use of funds are people willing to pay more for improved water services. This view is reflected in the findings of a study conducted by the UK Drinking Water Inspectorate (1998) which found that willingness to pay for improved water services was significantly influenced by consumers' attitudes towards the water companies. Amongst consumers from the lowest income groups, it was affordability which limited their willingness (or ability) to pay more for water services (Raje, 2002).

The following sections give some examples of the kinds of outputs from WTP studies.

Willingness to pay for improved water quality
Kim and Cho (2002) used a contingent valuation method to determine consumer WTP for the removal of high copper concentrations in their water. The general finding was that in smaller communities (in Minnesota, USA) the amounts that people were willing to pay would not cover the costs of improved treatment processes and systems. Similarly Cho, Easter, McCann & Homans (2005) looked at concentrations of iron and sulphate in community water supplies in south-western Minnesota. Again using a CV approach, on average, individuals were willing to pay US$5.25 per month (in 1995 U.S. dollars) to reduce the level of iron and US$4.33 per month to reduce the level of sulphate in their water to bring levels down to the USEPA's standards. Respondents who already thought their water quality was poor were willing to pay more to improve its quality. Again the aggregate WTP of the population was insufficient to meet the costs of achieving these goals suggesting the necessary changes would not be economically viable.

A similar finding was found in a Latvian WTP study that investigated consumers' WTP for cleaning up pollution in surface water supplies. Here Ready, Malzubris & Senkane (2002) showed that while Latvian consumers were prepared to pay up to 0.7% of their household income for improvements in surface water quality this sum, once aggregated, was insufficient to implement the necessary changes.

WTP for securing safe drinking water can be related to factors such as age, location, socio-economic status (SES) and level of education. For example Nielsen, Gyrd-Hansen, Kristiansen, & Nexøe (2003) found that older respondents were reluctant to pay any more to avoid future health threats from drinking water than younger ones. Al-Ghuraiz, & Enshassi (2005) found relationships between WTP and location among the population of the Gaza Strip. Here those living in poor villages without access to good quality supplies were prepared to pay substantial amounts to secure safe supplies. This presumably reflects the very poor nature of the supplies since most WTP studies tend to find that it is those with greater disposable income that are usually prepared to pay more.

In a study concerned with avoiding health risks due to contaminated drinking water Abou-Ali (2003) conducted both a CV and CM study of Cairo residents' WTP for improvements to secure safe tap water. Here WTP, as expected, is related to household income – the higher the income the greater the WTP. Better educated heads of households had higher WTPs too. Overall the study revealed a WTP around 1% of mean income for a decrease of 25% in the short run probability of health risks due to poor quality water and a reduction of 2% of the probability of contracting water born diseases in the longer term. These figures suggest a WTP below what would be economically viable for implementing the necessary improvements though the author notes

that there may nonetheless be non-financial considerations for proceeding with the improvements that would increase the general social well-being of the population. This study is interesting in that it used both CV and CM approaches which produced broadly comparable WTP estimates unlike previous attempts to use both approaches which have produced figures where the CV estimate was higher than the CM estimate by a factor of 20 (Boxall *et al*, 1996).

Dutch research on WTP for cleaner surface water (Brouwer, 2004) indicated a statistically significant influence on the WTP of the following factors:

- the proposed amount of money attached to different scenarios
- the importance people ascribed to having cleaner water
- annual income
- attitude towards paying for the environment
- doing any recreation activities with boats
- difficulties with answering the WTP question

Factors that did not seem to have a significant influence on the WTP for cleaner surface water were:

- demographic and socio-economic factors like age, gender, size of the household, area
- detailed water use factors like frequency of swimming, sailing, surfing or fishing activities on Dutch surface water
- factors related to the perception of the water quality
- factors related to the knowledge- and information level of the respondents (familiarity with the water quality standards, whether they think they are properly informed about these, degree to which people are familiar with the content of the information magazine, whether or not they visited the website, and the extent to which they know they already are paying for cleaner water
- factors related to their attitude with regard to environmental problems in general and membership of environmental protection organization like Greenpeace or WWF.

It is noteworthy that knowledge and information level, the perception of water quality and attitude regarding environmental issues apparently did not have a significant influence on the WTP in this case.

Willingness to pay for improvements to the water supply is also contingent on issues of ownership, and this has implications for the trend towards greater private sector participation in the European water sector. Willingness to pay is lower when the supplier is in the private sector (e.g. WTP studies in UK, Argentina, and Sri Lanka) and willingness to pay anything more is close to zero if the private sector supplier is seen to be wasteful or profiteering (Raje *et al*, 2002; DWI, 1998). Where the state or regional government is responsible, WTP can be higher than the status quo. For example, in Greece, residents were willing to pay up to €45 extra per year via their water rates in order to ensure the full operation of an existing but only partially operational

wastewater treatment plant. Reasons for the willingness to pay for a cleaner water environment included peoples' pride in their city, as well as moral and ethical concerns (Kontogianni *et al*, 2003).

Willingness to pay for stability of supply

Burn, Tucker, Rahilly *et al* (2003) used contingent valuation methods in order to examine the values people placed on current and possible future water restrictions in terms of their strength and duration. Out of 2032 Australian respondents, 21 % were willing to pay a one-off fee to avoid the current interruptions. Respondents who had experienced water interruptions in the past 5 years were on average willing to pay less for increased reliability than those who had not experienced a restriction.

CSIRO (Hatton MacDonald *et al*, 2005) research showed that Australian customers are willing to pay positive amounts to reduce the frequency with which interruptions occur. Unimportant aspects to customers are the provision of alternative water supplies during an interruption and notification of the interruption. Many of the main effects such as communication and the provision of an alternative water supply were not found to be statistically significant predictors of WTP. Variables such as age, perceptions of inconvenience, and income were significant predictors, however experience of an interruption did not have a significant influence on WTP.

To some extent these findings contradicted the pre-survey group work that suggested communication was very important. The findings about notification were also inconsistent with the CSIRO (2002) findings, where notification was named as being one of the most important aspects of interruptions. These differences may reflect differences in data collection method and thus should give rise to some caution.

Henscher, Shore and Train (2006) investigated Canberra households' and businesses' WTP to avoid drought water restrictions, using CM approaches. In this case participants appeared unwilling to pay to avoid low-level restrictions at all or to avoid higher levels of restrictions that are not in place every day. Participants seemed more willing to change their behaviours (e.g. watering their gardens on alternative days) rather than pay more on their bills.

In a US CV study Griffin and Mjelde (2000) assessed Texan customers' WTP to avoid water restrictions. Respondents were found to be willing to pay, on average, between $25.34 and $34.39 (in 1997 US Dollars) to avoid such restrictions. They also found that respondents were willing to pay, on average, $9.76/month (or 25.6 per cent of their bill) to improve future supply security levels. However, these authors question their own findings suggesting that the WTP figures are unrealistically high given the relatively low frequency of supply disruptions. A similar Californian CV study (Koss and Khawaja, 2001) suggested WTP figures of between $11.67 and $16.92 per month to avoid restrictions (in 1993 US dollars) though in this case WTP

figures were dependent on the frequency and severity of previously experienced restrictions.

Willingness to pay for bottled water
Bottled water purchasing can provide information about consumers' WTP for water services as the purchase of bottled water may indirectly reveal a WTP for higher quality drinking water (a 'revealed preference' in economic terms). Adote Abrahams *et al* (2000) argue that bottled water and filtered water are perfect substitutes for tap water since they fulfil the need for drinking water, with bottled water being purchased either as a risk averting behaviour by consumers to avoid a perceived (or 'real') risk, or for reasons of improved taste and odour, or appearance and/or convenience. It is assumed that bottled water prices are high because consumers are willing to pay these prices (Gleick, 2004) though Adote Abrahams *et al* (2000) note that drinking water from municipal supplies is essentially free given the price charged for municipal supplies and the relatively tiny quantities each individual can consume.

According to the bottled water industry, between 1999 and 2004 growth in global sales leapt from 98.4 to 151.4 billion litres (26 to 40 billion gallons) per year (IBWA, 2005). Market analysis has revealed that in 2005 alone, the global bottled water market advanced by 8.3%, with bottled water volumes reaching 173 billion litres, and is believed that it is likely to continue to increase in the future.

Since the 1970's, Europeans have been considered to be at the forefront of bottled water consumption (Kane 2000). Recent reports however have suggested that sales may be reaching a plateau in Western Europe, with rapid growth expected in Eastern Europe, whilst sales in the UK, US and most other places are increasing. There has been some evidence that in France and Italy consumers are moving away from premium brands and opting for lower cost alternatives (The Times, June 2006). This would suggest that the maximum WTP for bottled water has, or is just about to be, reached in these countries.

4.3 Acceptance

4.3.1 Service Interruptions

A number of studies have addressed consumer preferences and acceptance when supply systems fail. CSIRO (2002) conducted a study in Australia which investigated consumer preferences regarding interruptions to their water supply. People were asked what they would and would not consider acceptable. Overall, the results demonstrated that people could cope with short interruptions without complaint. Consumers deemed the most salient qualities of interruptions to be:

a) duration of the interruption;
b) notification in advance;
c) time of day the interruption happened; and
d) number of interruptions per year (planned and unplanned).

The study revealed several thresholds of acceptance or rejection, suggesting that there are phases between what is considered to be acceptable and unacceptable, particularly with regard to the number of interruptions per year, their duration and timing. In the case of frequency, up to two planned interruptions in a year were deemed as acceptable to most participants. At five interruptions per year there was a dramatic increase in people who did not consider this acceptable anymore. More than half responded they were able to accept up to two unplanned interruptions, but no more than five. In terms of the duration of interruptions, most consumers could cope with interruptions of up to five hours, with the ability to cope steadily decreasing as the number of hours exceeded seven hours. With respect to the timing of the interruption, there was clear indication that, as long as the interruptions did not coincide with key times in their daily lives, they were acceptable. Participants suggested they could cope with interruptions occurring between 9 am and 5 pm and between 10 pm and 6 am during weekdays. However, they indicated that they could not cope with interruptions that occurred on weekdays between 5 pm to 10 pm.

Generally, people had a greater sense of tolerance for planned interruptions than for unplanned ones. About two thirds of the respondents did not believe they should be compensated for either planned or unplanned interruptions. Here, customers stated that they would rather have the problem fixed than any form of rebate. They accepted that the interruption was necessary to provide better services. Some respondents did feel compensation could be given if the interruption was excessive, or if they weren't notified in advance. Overall, participants prioritised the following actions on behalf of the water company:

1. Fix the problem efficiently
2. No discount but invest more money to improve the system
3. Compensating households financially per interruption or per hour
4. Waiving the next quarterly bill
5. Public apology from the Authority

In the case of a failure in supply, the focus group discussions revealed that people could cope with short unplanned interruptions. However, in cases of unplanned interruptions, consumers preferred as much feedback as possible about the cause, whether repair crews were in attendance, and some estimate of the likely duration of the interruption. Aspects of interruptions that were considered most important to customers were: number of interruptions per year, duration of the interruption, time of day, how to handle the interruption, and quality of water supplies after the interruption.

A related theme was that of response or communication. Consumers stated that they expected immediate rectification in the case of unplanned interruptions. Consumers wanted as much feedback as possible and a telephone number they could use in case of an unplanned interruption. The water utility should be contactable and informative at the time of an

unplanned interruption. People wanted quick responses from the water utility and they expected them to take steps to prevent the same thing from happening again (e.g. by presenting an evaluation report).

Issues of accountability were also considered important. The CSIRO study termed the first form of accountability as *prospective*, in that the public should be included in the setting of customer standards for water interruptions. Involving the public can be realised by representation of the general community by someone from the local government, conducting community surveys and/or discussion groups. Customers certainly felt that there was a need for monitoring the water company's performance (by a government body or regulator to ensure the provision of acceptable levels of service). Notification cards for planned interruptions were deemed acceptable (preferably at least 2 days in advance). *Retrospective accountability* referred to the aftermath of water supply episodes. Consumers did not expect compensation unless extreme hardship or extra expense had been incurred. Reimbursement was only expected if extra expenses had been incurred. Customers believed that any form of compensation would be paid for out of their own water rates anyway. They also stated that they wanted feedback in terms of the corrective actions taken by the water company to resolve water supply issues.

A similar measured consumer response to supply interruptions is reported by Joshi, Talhande, Andey & Kelkar (2002) who surveyed consumers in Ghaziabad and Jaipur areas in India. Most consumers made some attempt to store water in case of interruptions which were relatively common compared to the Australian example above. They had developed routines for dealing with intermittent supplies but nonetheless had no complaints about water tariffs and continued to be in favour of a piped continuous supply.

Owen (2000) reports a study of why and when people complained about their water supplies. Her UK study suggests that a major factor in determining whether a customer complains is their political orientation towards the privatised (this was a UK study) supplier. While many in her sample could have legitimately complained about, for example, discoloured tap water, during the period of the study people were more likely to have complained if they already had a negative attitude toward privatisation in principle and/or the privatised supply company in particular.

4.3.2 Environmental issues

The Consumer Council for Water (2005) focus groups also generated discussion about environmental issues in relation to the scarcity of water, increases in population and irregularities of weather. However, many of these UK consumers found the issue of water scarcity difficult to reconcile in what they regarded as 'such a wet country', whilst others referred to media stories concerning water companies' poor record on leakages and water conservation. Indeed, many people were concerned that the costs of poor management by water companies were being passed on to them as the

consumer, often leading to debates about water company profits and issues of fairness.

There is some evidence that where water stress is widely understood by the population they are prepared to accept alternative measures to improve supplies. In Adelaide consumers have responded positively to the to a proposal to introduce desalinated water supplies after a recent public tasting of desalinated water and the publication of reports indicating the likely degree of water shortage in the near future (The Advertiser (Australia), 1.2.07). However the South Australian government remains sceptical that consumers will accept the likely increases in prices required to fund a sufficiently large desalination plant and no firm proposals have yet been implemented.

4.3.3 The case of the acceptance of recycled water

Of all drinking water related consumer research by far most intensively studied area has been consumer acceptance of proposals involving waste water recycling (e.g. Bruvold, 1981, 1985, 1989, Marks, 2003; PIEOW, 2003; Southern California Water Recycling Projects Initiative, 2004; Ulhmann & Luxford, 1999; Po, Kaercher & Nancarrow, 2004; Stenekes, Colebatch, Waite & Ashbolt, 2006). A number of proposals have been made to introduce re-use schemes in the USA, Australia and Singapore and in all cases relationships between suppliers, regulators and consumers have been seen to play a key role in the outcomes of these initiatives.

The idea of recycling waste water, particularly sewage, is not generally regarded as an attractive solution to water shortages by most publics. It generates what has become known as the 'yuck factor' and a number of high profile campaigns have emerged to counter recycling proposals. Dolničar and Saunders (2006) argue that emotional barriers to recycled water usage need to be considered if there is to be consumer acceptance of recycled water, even if the recycled water is of the highest quality. Hartley (2006), however, notes that consumer concern about recycled water usage is tempered by an individual consumer's proximity to the wastewater source; consumers are more willing to use their own recycled wastewater than wastewater drawn from a common source.

Russell and Hampton (2006) caution that little is known in general terms about consumer reactions to recycled water usage and thus predicting consumer responses in relation to specific proposals is difficult; local factors make the transfer of results from one area to another difficult. They note that general support for the use of recycled water does not necessarily translate into support for a specific project, and that the absence of explicit evidence of anxieties does not necessarily mean a true absence of concern.

Po *et al* (2005) conducted a study examining consumer acceptability of the use of recycled water in a variety of contexts in Australia. More than 90 percent of respondents in their study agreed that it was acceptable to use recycled water

for the watering of public parks, golf courses, or the flushing of toilets, and more than 80 percent agreed that it was acceptable to use recycled water for watering home lawns and gardens or pasture land. Using recycled water was not considered acceptable for either drinking or cooking by a significant majority of respondents. The study found that only 13 percent of respondents would consider drinking recycled wastewater, with 73 percent indicating that the cost of the recycled water would make no difference to their decision.

There are successful recycling schemes which most notably include the implementation of Singapore's NEWater project. The Singaporean Public Utility Board recognised the need to find a comprehensive solution to develop public acceptance and support and created a Visitor Centre as a key focus of the public education and outreach strategy to address public awareness and acceptance. Since opening in February 2003, the NEWater Visitor Center has reportedly become a tourist destination, as well as a place of genuine interest for the community. Similarly in Namibia there has been a successful implementation of recycling at the Goreangab Water Reclamation Plant in 2002 and there have been few reports of public opposition or concern. Anecdotal evidence suggests that the community responded to the scheme with considerable pride towards their city's "ability to overcome environmental adversity and in its role as a world pioneer of direct potable reuse" (Khan and Gerrard, 2006).

Bronfman *et al* (2003) state that the more a country develops, the greater becomes its population's concern about hazards and the greater demand for their control and regulation. Moreover, an affluent society becomes more suspicious of new technologies, in that public attitudes to, and trust in science and technology can be low, whilst levels of public awareness of the hazards and potential benefits are varied.

4.3.4 Willingness-to-accept as compensation

When looking at acceptance there is a special category of study that looks at willingness-to-accept (WTA) certain amounts in compensation for the loss of a service or acceptance of a 'bad' (the opposite of a 'good'). These draw on the same methods and conceptual frameworks of willingness-to-pay studies.

4.4 Critical notes

The articles and reports listed in appendix II, and additional national, international and sector crossing literature[3] served as input for this chapter. The outcome of the literature study is a collection of fragmented research results, rather than a comprehensive overview of what 'the' consumer accepts, prefers and is willing to pay. This is due to differences in used terminology, research set-up, indicators, methods and analysis techniques that complicate summarizing of and concluding on research findings.

[3] Full reference list from p. 57 onward.

On top of conceptual and methodological issues that complicate research of consumer issues in the drinking water sector, it is accepted that 'the' consumer does not exist. Socio-cultural differences between groups make it impossible to generalise research findings for all consumers. However, despite the influences situational differences may have on certain consumer preferences, there is still a lot to learn from other cultures and other researchers.

5 Recapitulation and implementation

5.1 Status quo of consumer satisfaction, acceptance and preferences research

In this report contemporary research from countries all over the world in the field of domestic consumers of drinking water is discussed, as well as methods to assess preferences for drinking waters services. This report gives an overview of what is and what is not known in the literature in the field of consumers and drinking water services. It is written with the perspective of employees of water companies involved in consumer issues in mind. We have attempted to write it as practical as possible in discussing research methodologies, without compromising the scientific nature of the contents.

The outcome of the literature study is not a comprehensive overview of what 'the' consumer accepts, prefers and determines satisfaction for a number of reasons. First of all, there is no common theoretical frame, which causes terminological confusion and lack of rigour to prevail in research on consumers. It is difficult to compare outcomes if deviating indicators are used, or it is not clearly defined what exactly has been studied. Secondly, the previous chapter shows that measuring consumer preferences requires sophisticated methods and precise wording. The studies under review all aim at specific goals and a have different set-ups, partly due to cultural differences between locations or regions. Some studies may investigate consumer preferences for a specific service attribute (for example, the installation of a water meter), while other studies focus on a broad range of service attributes (general satisfaction on service provision). Even in studies with a similar scope, different indicators are used, i.e. the indicators used to measure customer satisfaction on customer relations activities (an overview of indices used in Dutch research is provided in appendix VI). Thirdly, distinct research methods have been used, and fourthly, the techniques used to analyze the outcomes of the studies vary. Lastly, it should be mentioned that 'the' consumer does not exist due to socio-cultural differences. Even in small areas different consumer groups can usually be distinguished.

In the introduction it was stated that the aim of this study is to learn from others and previous experiences and based on that, tailor a method to assess consumer preferences for drinking water services. In order to reach this goal a number of questions was posed about preferences, willingness to pay and acceptance of domestic consumers. Although it has not been possible to conclude in general terms on satisfaction, acceptance and preferences of domestic consumers, it has been possible to learn from the research findings and to tailor a method to assess these issues. How the outcome of this research can be used by water companies is formulated in the next section.

5.2 Implementation

Among the most important benefits this research project brings to the water companies, is that it informs them about all that encompasses consumer research in the field of drinking water; it provides background information about why and how to do consumer research, gives an overview of the current state of consumer research in the drinking water sector and addresses the difficulties involved in this kind of research. This report provides support to the water companies in creating structure in an otherwise *ad hoc* way of investigating consumer issues and preferences. Considering the fact that very often consumer research results are used to change existing (or formulate new) company policy or management guidelines, it is worth re-evaluating the basis of the incentives to change.

The report discusses various techniques and methods for consumer research. It explains the goals, pros and cons of the techniques and methods for investigating consumer research in the drinking water context. The findings of this report enable water companies to make well-founded decisions regarding research methods to be used for investigating consumer issues. If a (market)research company is hired to perform consumer research, this report provides the information necessary to ask valuable questions about the chosen methodology, so that optimal results can be obtained.

From the research techniques and methods described, four are used to compose a methodology for water companies to assess what their domestic customers prefer, accept and if they are willing to pay for certain services. The components or steps from the proposed method can be used separately if a water company wants to have a deeper understanding of the consumer's valuation of a specific aspect (attribute) of a product or service.

Lastly, the report provides an overview of the results of international research in the field of consumers and drinking water. It indicates what the studied populations would prefer, what they would accept or would absolutely not accept. As a result of the discrepancies between the studies under review in terms of scope, approach, methodology and carrying out, it is not possible to draw in-depth conclusions about what consumers want, accept, or are willing to pay for in general. Moreover, due to cultural differences, which may even be present between regions within a country, it is unjust, and presumable often impossible to generalize research findings to other consumer groups or peoples. The international literature and research findings, besides providing an overview of available and missing information do enable the creation of two frames. Firstly, a frame of reference for researchers worldwide to investigate what has already been studied, what methods have been used to do so, and what experiences did others have with it. Secondly, it provides knowledge to construct an all encompassing theoretical framework for consumer preferences, satisfaction, acceptation and interaction with the water company.

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I Explaining consumer preferences – Social sciences models incorporating preferences and acceptance

Here we discuss a number of concepts that regularly appear in research on consumer behaviours and we focus this on service provision rather than models of consumer choice in 'true' markets (i.e. where consumers are presented with a number of competing products from which to choose).

I – 1 Models on Satisfaction / Perceived Service Quality

Research on satisfaction with service quality and service providers has a long history but it is probably fair to conclude that this research has largely been of an *ad hoc* nature with numerous theoretically unconnected surveys and polls. The same applies to studies of attitudes towards governments and regulatory bodies. Most major companies commission poll research to gauge client satisfaction and approval ratings but the measures used are usually industry-specific questions often limited in number and sophistication. Typically, a number of service-specific attributes are rated on 5 or 7 point scales much as described in the previous section which are analysed primarily descriptively.

The area is not totally devoid of conceptual traditions however. One common approach is known as GAP analysis. According to Kotler (1994) there are five potential gaps in the delivery of services:

- consumer expectation and management perception - the management may not perceive the customers' needs
- management perception and service-quality specification - the management may assess the customer requirements but may not define this with sufficient clarity for their staff
- service-quality specification and service delivery - the staff may have conflicting demands and may not meet the standard of service required
- service delivery and external communication - the customers may not get the service which they have been led to expect from external communications
- perceived service and expected service - fast food staff may clean tables frequently but this may be perceived by the customers as an indication that staff are rushing them through the meals

The literature has been concerned with identifying which dimensions of service quality are the key ones on which to focus GAP analyses. The theories of service quality are dominated by multidimensional structural frameworks and there are broadly two schools of thought about the number of key dimensions of quality that consumers look for: these are the Nordic European and the North American schools. Early service quality researchers established

the Nordic European School which suggested that service quality was assessed on two, or at most, three dimensions. The suggestion was that measurement of service quality is based on a kind of "disconfirmation theory" where quality is assessed on whether a service was better than expected or worse than expected (Grönroos, 1984; Lehtinen and Lehtinen, 1991). Evidence that people did indeed assess quality on two or three basic dimensions was not clear and so debates have ensued about how many key dimensions there were.

The North American School made a significant contribution to the measurement of service quality with a well known model called SERVQUAL (Parasuraman *et al*, 1985). The model was developed as a result of research across a range of service industries including retail banking, credit card provision, security brokerage and, product repair and maintenance. The SERVQUAL model suggests that quality is assessed on five abstract dimensions of quality; assurance, responsiveness, reliability, tangibles (physical facilities) and empathy. According to the model, service quality is a "gap" between the customer's expectations and perception and therefore, it should be measured by subtracting customer's ratings of the performance (P) on the quality dimensions from customer expectation (E) on each dimension. The greater the positive gap (P > E) the better service quality and vice versa.

The picture is complicated by the fact that other researchers have reported differentially interpretable service quality factor structures varying from one to sixteen service quality factors which appear to differ from the SERVQUAL model in different service sectors (Carmen, 1990; Lewis, 1984). However, Teas (1994) has proposed what he regarded as a more relevant model. His Normed Quality model (NQ) was based on the effect of such factors as the number of attributes a service has, the importance of each attribute, the individual's perception of the amount of the attribute that has been provided and the individual's perceived amount of attribute possessed by the norm (a norm-referenced expectation). Furthermore, the Nordic European School suggest that a two factor model may be sufficient formed of the SERVQUAL "tangibles" dimension and an amalgamation of the remaining four dimensions.

The debate about how many dimensions of service quality there are continues and it is most probably the case that the number is dependent on the service sector concerned. Some sectors offering complex services may be evaluated on more dimensions compared with those that offer comparatively simple services. Recent methods for assessing customer satisfaction such as the Subjective Social Indicator method (see section 3.2.3) allow participants to define the relevant attributes and qualities of a service and go some way to allowing researchers to identify the key dimensions relevant for any given service.

I – 2 Trust as a Factor in Perceptions of Risk and Acceptance

Trust vs. Confidence

Bellaby (2006) describes trust as "reliance on another agent to deliver an outcome that is in one's own interests, and, by implication, reliance on the other not to take advantage of this dependence to achieve contrary goals".

Trust grows out of tacit understandings about social structure, in other words, common knowledge or taken for granted assumptions that a person or entity is 'trustworthy'. Following Siegrist *et al* (2003) we draw the distinction between *trust,* which involves some judgement of similarity of values and intentions and *confidence* which is a belief based on past experience that events will occur as expected. This may seem a subtle distinction at first but trust, in handing over power to another, is fundamentally a feature of a social relationship where one has to impute openness, fairness and integrity (among many other possible characteristics) to another. Confidence that something will happen on the other hand does not necessarily involve trusting the agents involved.

Thus while confidence and trust will often go together they do not have to.

On the basis of past experience of the delivery of good quality water one might have developed confidence that there will continue to be good quality water coming out of one's tap. It may not be necessary or relevant here to have to trust the motives and values of the supplier and to judge whether these are consistent with one's own well-being and interests. Indeed, Siegrist *et al,* (2003) argue in the context of electricity supplies that where past competence has led to high confidence in the supply, trust in the supplier is essentially unimportant. In such cases trust only comes into play when something has gone wrong with the supply and it is no longer possible to be confident that the supply will continue as before.

In other situations, particularly where the consumer has little past experience upon which to base estimates of competence and thus confidence, trust will become relatively more important and will be used to impute likely competence to the relevant body. When, for example, a new treatment process or regulatory framework is proposed there will usually be no direct experience for consumers to use to base confidence estimates on and thus trust based on an assessment of the supplier's and regulator's motives becomes important.

The so called Dual Mode model of trust and confidence (e.g. Earle & Siegrist, 2006) suggests that both trust and confidence contribute to acceptance and willingness to cooperate. It therefore remains important to keep this distinction between confidence (based on past competence) and trust (based on value similarity) in mind when discussing this literature.

A good deal of research shows that trust is related to the perception and acceptance of risk (e.g. Bord and O'Connor, 1992; Freudenberg, 1993; Siegrist, 1999 etc.) and it is usually assumed that trust influences perceptions of risk which in turn influence acceptability. Broadly, if a body or authority is trusted then perceptions of risk arising from their activities will be lower and thus the public will be more accepting of their activities. Numerous studies

show correlations between trust, risk perception and acceptance but this merely demonstrates that the two constructs are linked; it does not indicate how they are linked.
Eiser, Miles & Frewer (2002) and Poortinga and Pidgeon (2005) both address this issue and define two alternative models of the relationship between trust, risk perception and acceptance. The trust leads to lowered risk perception leads to acceptance model is referred to as the 'causal chain' account of trust and is illustrated in Figure 12.

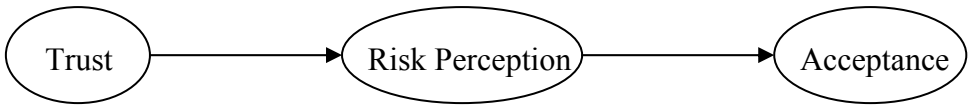

Figure 12 The Causal Chain Model

The alternative view, referred to as the 'associationist view' (Figure 13) argues that trust is an outcome of acceptance rather than a factor implicated in its genesis. People respond to a potential hazard in the broad sense of willingness to approach or avoid it on the basis of affective reactions which are made before extensive cognitive processing of other relevant information (cf. Finucane, Alhakami, Slovic & Johnson, 2000). This is referred to as the 'affect heuristic' – affect precedes cognition – emotions precede thought.

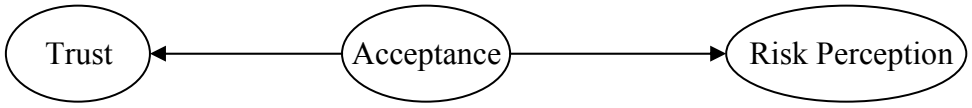

Figure 13 The Associationist Model

Both Eiser *et al's* (2002) and Poortinga and Pidgeon's (2005) studies suggest that in the context of food technologies the associationist model seemed to give a better account of the data. While there was, in the latter study a small residual direct influence of trust on risk perceptions it seemed that people's existing evaluations of these technologies seemed to drive levels of trust.
The implications of these studies are potentially quite far reaching. If it is true that people respond to a potential hazard using something like an affect heuristic and this response causes both trust and risk perceptions then the water industry's concern to work on improving consumer relations in order to enhance trust is unlikely to have the effect of lowering perceptions of risks from potential water supply hazards. In addition the model would predict that the emergence a negative hazard event or a proposal to introduce an unpleasant technology might have the effect of degrading consumer trust (see also Marks, 2003). As noted earlier, negative events have a high signal value and trust, once lost, is quite hard to regain.

While we do not suggest that fostering trust is pointless - there are plenty of other good reasons to have good relations with consumers - there may be a case for limiting expectations of positive knock-on effects in terms of acceptance of change or technological advance. What we do not yet know is whether the associationist model applies in various water-related contexts and clearly this is an area that needs further research.

I – 3 Risk and Hazard Perception

Objections to new developments and complaints about a service or product are often linked to perceived risks associated with it. Such perceived risks can lead to financial loss, physical harm, or be psychological in nature. For formal risk assessors the amount of risk associated with a hazard is assessed by a measure of the degree of harm or damage that might follow from exposure to the hazard multiplied by the likelihood that this exposure will occur. However, for many decades there has been a debate about why such 'expert' risk assessments do not seem to correspond with 'lay' assessments of risk. For example, most studies show that people perceive far more risk and threat from living near a nuclear power station than they do from driving a car. Formal risk assessments would place driving a car as the more risky behaviour and the question has been why is it that people will campaign against power stations yet happily continue to drive.

The 'Psychometric Paradigm', developed by Slovic, Fischhoff, and Lichtenstein (1980) was particularly influential in the field of risk research during the 1980's. The psychometric approach suggests that for those who are not risk assessors hazards are perceived according to the qualitative characteristics of hazards, known as 'risk attributes' and that many more of these attributes are considered than are considered by risk assessors who concern themselves only with extent of harm and likelihood of harm. The additional attributes considered include the perceived voluntariness of exposure to the hazard, fairness of exposure (e.g. culpability of any causalities), levels of containment, levels knowledge and awareness of exposure, lack of trust in those responsible for monitoring or regulating the hazard, familiarity of the hazard, the unknown nature of long-term effects, unclear social advantages or benefits and extent to which a person can identify with the casualties.

Hazards in different domains have different degrees of the aforementioned attributes. In a classic study Slovic (1987) asked participants to rate 81 hazards on a number of dimensions, such as controllable vs. uncontrollable; voluntary vs. involuntary; consequences fatal vs. consequences not fatal etc. Using factor analytic techniques he found that two main factors explained the ways in which members of the public categorised the hazards – seriousness of consequences (perceived dread) and degree of familiarity (unknown risk). As seen in Figure 14, a dreaded hazard (Factor 1) is characterised as being uncontrollable, exposure to it is involuntary, with potentially globally catastrophic consequences and high risks to future generations. Incidents related to nuclear power were most prominent on this dimension. Unknown

hazards (Factor 2) were characterised as unobservable, new hazards that were unknown to science. Chemical technologies scored highest for this factor. Put crudely the key here is that expert assessors are effectively only rating hazards on dimensions strongly related to Factor 1 here yet the lay public are introducing additional (Factor 2) considerations into their assessments.

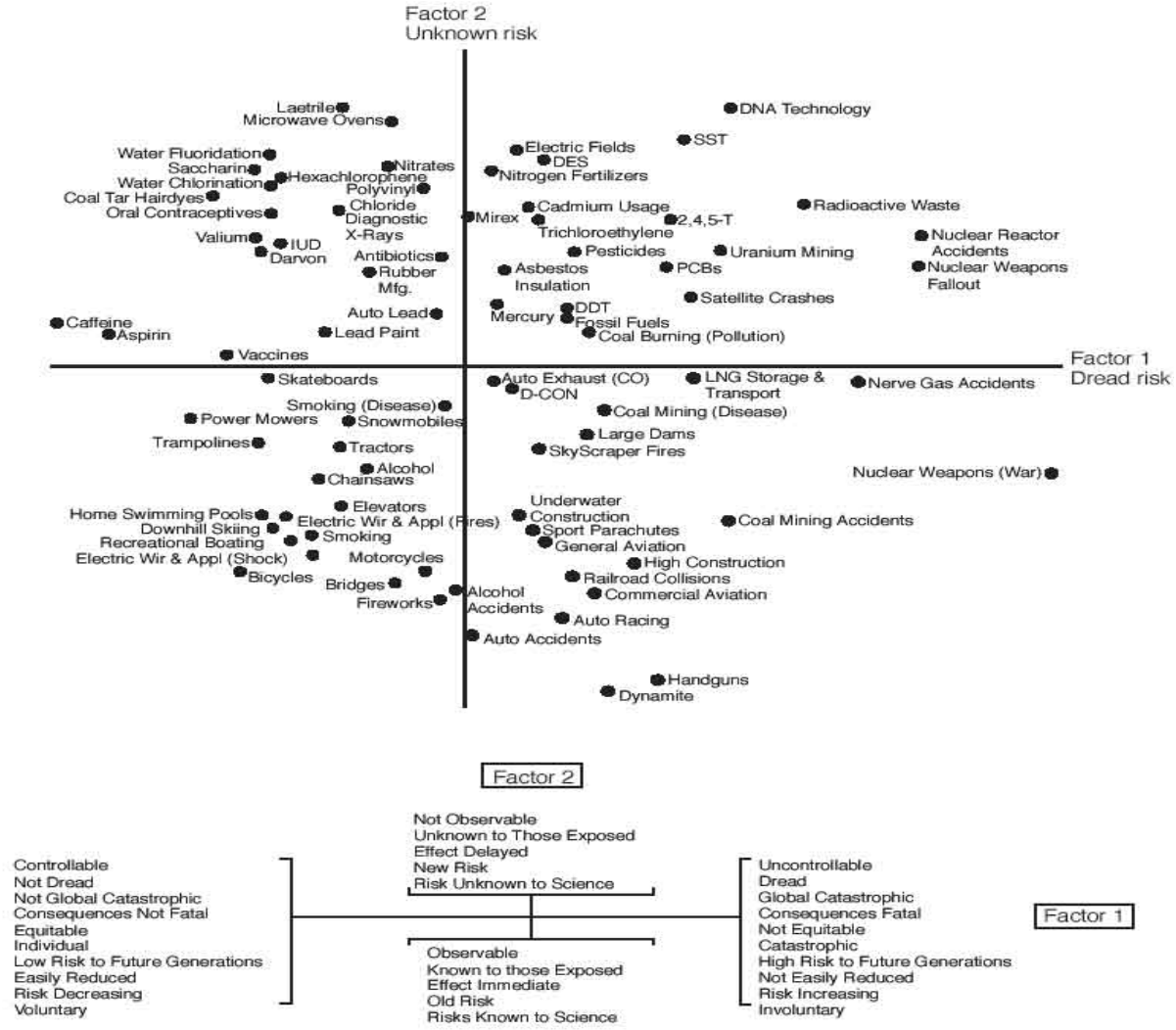

Figure 14 Location of 81 hazards on Factors 1 and 2 derived from the interrelationships among 15 risk characteristics. Each factor is made up of a combination of characteristics, as indicated by the lower diagram. [Source: Slovic (1987)]

Hazard perceptions are also influenced by socio-demographic background factors. Flynn *et al* (1994) conducted a survey in which perceptions of environmental health risks were measured for 1275 white and 214 non-white people. White males tended to differ from the other members of the sample in terms of their attitudes and perceptions (see Figure 15). They perceived risks to be much smaller and much more acceptable than others. Drawing on these data, the authors suggest that socio-political factors such as power, status,

alienation, and trust are strong determinants of people's perception and acceptance of risk.

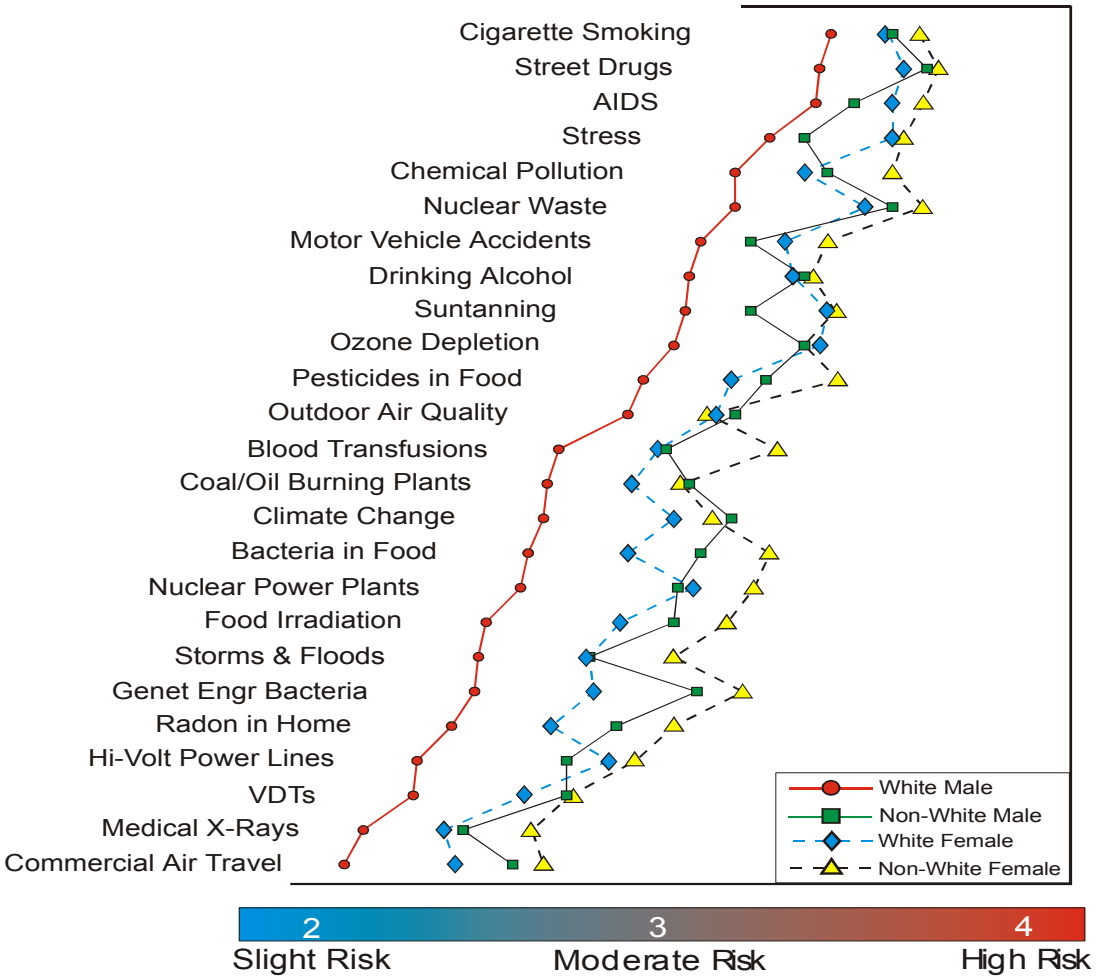

Figure 15 Gender and race differences in ratings of environmental hazards.

Other lines of research have focused on how perceptions of hazards are influenced by social settings and social, cultural and organisational factors, as opposed to the more individual level described above and implicit in the psychometric paradigm. These approaches assume that wider contextual issues, such as social relations, trust in government, industry and risk management, also influence public perceptions of risks.

Risk/Hazard Perception as a Driver of Concern

Elements of the psychometric paradigm are still regarded as highly influential and have recently been integrated within the UK's HM Treasury Report on managing risks. Here six indicators are regarded as key to understanding the nature, and drivers of, public concern (nb. the report uses 'risk' to mean 'hazard' here).

1) Familiarity and experience of the risk
In general, people are more concerned about risks which are new to them and about which they have only a little knowledge or experience

2) Understanding of the cause-effect mechanism
People may be more concerned if the cause-effect mechanism is unknown or uncertain (e.g. if experts disagree) or if they themselves find it difficult to understand from the available information what effects hazards may have and how likely it is that they may be harmed

3) Equity of the consequences of the risk and the associated benefits
People tend to be more concerned if they perceive that the effects fall unfairly on a specific group in society, particularly if they themselves are part of that group

4) Fear of the risk consequences
People are naturally more concerned if the form of harm is particularly horrific, such as if it involves long term extreme pain, impacts on future generations, widespread impact, or because the harm (or degree of harm) is unknown or uncertain and could be very severe and irreversible. There may well be other reasons why fear is particularly high which might depend on individuals' perceptions and the context

5) Control of the risk
People tend to be more concerned if they feel they have no control over the risks involved

6) Trust in risk management
People tend to be more concerned if, not having personal control over the risks involved, they also do not trust those responsible for managing the risk on their behalf.

Source: HM Treasury, 2005, pp. 11

In a series of in-depth focus groups, Petts *et al* (2003) found that when discussing day-to-day concerns, most revolved around health and health care, followed by crime, law and order. Other concerns, such as food (e.g. genetically modified products), new technologies (e.g. mobile phones) and the environment (e.g. climate change) featured to a lesser extent. Within the focus groups, individuals tended to relate these issues to personal or local experiences – concerns were embedded in socio-cultural factors. This was found to be particularly the case for health and health care issues, where people voiced concerns about issues as they directly affected their own day-to-day lives.

I – 4 The Social Amplification of Risk

The process of *social amplification* refers to the social dynamics that influence how risk events are represented and communicated. The Social Amplification of Risk Framework (SARF) was developed in order to understand the social processes that mediate the relationship between a hazardous event and its consequences. SARF emphasises the social contexts in which risks occur, and assumes that risk events have a *signal value* that is propagated through a social network. In Stage I the focus is upon the hazard event and the relationship between the various stations of amplification and their relationships with public perceptions and initial behavioural responses. Stage II of the framework is concerned with secondary impact, where there is a hypothesised link between the amplification of risk perceptions and behaviours and secondary consequences, which consist of socio-economic and political impacts (Breakwell and Barnett, 2001).

Flynn *et al* (2000) state that risk is amplified when:

- A new and possibly catastrophic risk has emerged;
- The risk managers try to conceal the risks: so when found out the public think they cannot be trusted;
- The risk managers are not in control of the hazard;
- The experts do not understand the risks or do not understand the long-term cumulative effects of chemicals or contaminants.

They go on to state that risk is attenuated when:

- Risks do not resonate with public concerns and fears/dreads;
- Media reporting on the hazard is limited and not sustained;
- Benefits of the hazard are necessary;
- Hazards are well understood and controlled;
- Managers are trusted and display control and expertise.

Examples of recent cases in which social amplification effects have occurred include the threat Severe Acute Respiratory Syndrome (SARS), anthrax contamination of mail, bovine spongiform encephalopathy (BSE), H5N1/bird flu and Legionella pneumophila outbreaks. Relatively small incidents involving new, unfamiliar technologies can cause greater unrest than a train incident with many casualties. The role of the media is important in this. An explanation for this can be found in the effect that the media have on involvement. *Involvement* is the consumer's perception of the importance or personal relevance of a product or service. Despite the fact that involvement is usually low for everyday products (water, bread, socks), the situational sources (including the media) are likely to influence the level of involvement consumers feel. The media and other sources of information can also have an influence on confidence. By informing consumers, both confidence and awareness can be raised. This in turn may influence the trust people have in the responsible institutions and the government (Petts, Horlick-Jones, Murdoch, 2001). However, research in some technological domains has suggested that merely communicating about a potential hazard or even suggesting that something might be a hazard can itself raise concerns that were not present previously (cf. McGregor, Slovic & Morgan, 1994). Such

hazards, by definition will not be ones that the public are familiar with and this will be perceived as high on psychometric model's Unknown Risks Factor 2 discussed above.

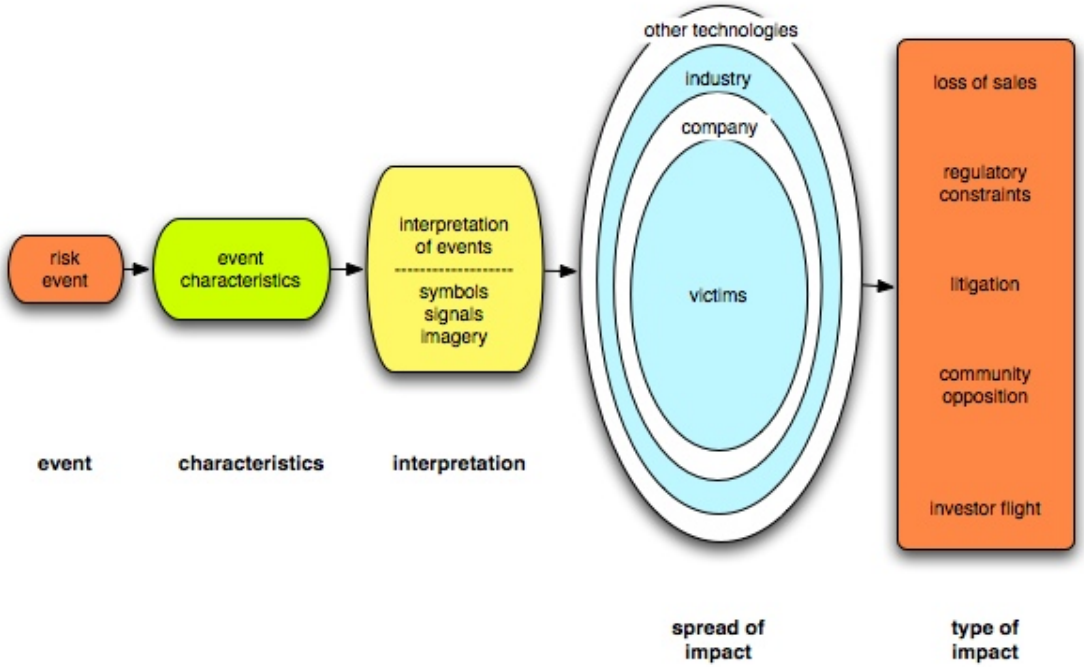

Figure 16 The Social Amplification of Risk Framework. Adapted from: Kasperson, et al, (1988)

I – 5 Acceptance

Studies on the relationship between acceptance, trust and risk perception have touched on different aspects of this relationship. Using the psychometric approach discussed in the section "risk and hazard perception" of this appendix, risk perception studies have been used to forecast acceptance and opposition to specific technologies. Slovic (2000) notes that nuclear power has been a frequently researched topic due to the substantial public opposition it has provoked despite experts' assurances of its relative safety compared to other hazards and behaviours. Here the research has demonstrated that people judge the benefits of nuclear power to be small, whereas the risks are regarded to be unacceptably great. Fischhoff *et al* (1981) proposed that levels of acceptance will be governed by various factors, resulting in the typology in Table 3.

In line with examining risks in context, Pidgeon *et al* (2003) conducted a major quantitative survey that aimed to investigate the relationships between public attitudes to science and risk, trust in risk regulation and risk governance. The study also explored levels of acceptance. Pidgeon *et al* researched perceptions of five key hazards; genetically modified food, climate change, mobile telecommunications, human genetics, and radioactive waste. They found radioactive waste was viewed most negatively of the five hazards. It was

regarded as having the lowest benefits and the highest costs. Evidently, concern about radioactive waste was high, and it was seen as the least acceptable hazard. Conversely, genetic testing was deemed most acceptable with relatively low perceived risks and higher perceived benefits, and thus generated lower levels of concern.

Table 3 Typology of levels of acceptance [Source: Fischhoff et al, (1981)]

Risks perceived to…		**…risks perceived to…**
be voluntary		be imposed
be under an individual's control		be controlled by others
Have clear benefits		have little or no benefit
be fairly distributed	**are more accepted than**	be unfairly distributed
be natural		be manmade
be statistical		be catastrophic
be generated by a trusted source		be generated by an untrusted source
be familiar		be exotic
affect adults		affect children

Attempts have also been made to identify factors that influence levels of acceptance. Much attention has been paid to the nature of public knowledge, values, attitudes and concerns, and where these fit in with decision-making processes. In the light of previous instances of public resistance to technical change, institutions are increasingly consulting and sponsoring public understanding of science research (Irwin & Michael, 2003).

In studies such as the above there are always a number of methodological issues that should encourage caution in seeking generalisations. Taking the radioactive waste hazard as an example, respondents' ratings of the benefits of such waste are likely to be influenced by the framing of the survey questions. If asked whether such waste has any benefits in a way that is context-free most people would initially assume not. If, however, the question is set in the context of radioactive waste generated as by-product of a medical intervention that you or one of you family had just benefited from, the ratings are likely to be different. Given this kind of contextual effect any study of the acceptance of specific technology/service/product needs to involve some qualitative investigation of the contexts in which the acceptance (or not) has to take place.

II Overview literature research

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
1	**Determining Customer Service Levels – Development of a Methodology Overarching Report**	Andrew Speers, *et al*, CSIRO 2002	Australia	• Pressure • Quality restrictions • Interruption issues • Preference for greater spending on those issues.		**Customer preferences** • **Subjective Social Indicator: to determine whether there is a gap between Achieved Levels of Service Provision and Goal of Service Provision** • **ASP dimension measured by asking respondents to rate from 1 to 10 how satisfied they are with (see indicators)** • **Then two separate questions were asked to measure the GSP. Rating the importance of the ways the four water service issues are handled in regard to their present lifestyle, and the responsibility of the water utility to provide a good level of service for handling those four water service issues.** • **The Need for Service Provision Score (represented by the gap between GSP and ASP). A negative score indicates an over provision of service, while a positive score indicates a need for improvement in the service.** **Willingness to Pay or Accept compensation if a reduction in a standard is proposed** • **State of the art mechanism for assessing willingness to pay or accept is a technique known as CHOICE MODELLING (contingent valuation has more flaws)**
2	**Setting and evaluating customer service standards,**	Water Science and Technology, Vol 3, 2003 Speers, A. *et al,*	Australia			• **Contingent Valuation technique: customers are asked how much they would be willing to pay for a certain level of service. Technique prone to significant**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
		CSIRO 2002				**embedding problems and does not allow differentiation of the components the service customers value the most** • **Choice modeling: technique for determining preferences from a range of attributes. The correspondent is confronted with a series of choice sets and is asked to select one or to rank them in order of preference**
3	**What consumers value regarding water supply disruptions: a discrete choice analysis**	Hatton MacDonald, D.	Australia	• The increase in annual water bill and the frequency of future interruptions were the most important attributes in the models of choice	• People are willing to pay positive amounts to achieve a water supply that is less frequently interrupted	• **Stage 1: insight into the terminology that was meaningful to consumers and to determine the components of the water service that were important to them (qualitative interviewing): focus groups. Of particular interest was the nature of the attitudes that the general community held towards the service. Important that stage 2 would not be measuring something that people only thought about purely because they were asked (non-attitudes) : focus groups (poor response rate)** • **Stage 2: testing the preferred methodological approaches for reliability and validity. By telephone survey to test chosen methodology of subjective social indicator, need for service scale. Chosen because of the existence of context effects.** • **Latitude of acceptance method to measure preferences in relation to the various components of the service** • **Survey to measure willingness to pay and accept (choice modeling). Drop-off-pick-up format in order to ensure that respondents were given time to think carefully about the questions** **→ Multinomial logit model (MNL)**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
4	**Assessing water company customer preferences and willingness to pay for service improvements: a stated choice analysis**	Water Resources Research, Vol 41, 2005	UK, Yorkshire water	Service factors: • Security of supply • Interruptions to supply • Drinking water biological quality • Drinking water discoloration • Leakage • Inadequate mains pressure • Lead in drinking water • Sewage flooding into properties • Areas flooding by sewage • Nuisance from odor and flies from sewage treatment works • Pollution incidents • Ecological quality of rivers • Ability to use inland waters for recreation • Bathing beach water quality	**Customer preferences** • increased security of supply • improvement to water quality • reduction in the number of properties subject to flooding by sewage • reduction in the number of incidents of sewage polluting water courses • reduction in number of properties subject to inadequate main pressure • reduction in the number of properties suffering an temporary interruption to water supply **Willingness to Pay (WTP)** • 0.317 for each percentage increase in security of supply • 0.03 for each reduction in the number of water samples that failed to meet the biological and chemical water purity standard • 2.27 per year for every 1000 fewer properties subject to a water supply interruption of 7-12 hours during the year • 0.78 per year for every 1000 fewer properties complaining about discolored drinking water • 1.53 per year for every 1000 fewer properties that suffers from inadequate mains pressure • 0.69 for every percent reduction in water lost through leakage in supply pipes • 0.78 for absence in discoloration • WTP for environmental improvement (ecological quality	• **The aim of the research project was to estimate the benefit YW customers derive from marginal changes to the level of service provided with respect to a range of service factors.** • **The results were used to determine whether the benefit exceeded the costs of improving particular service levels and if so to what extent service factors should be improved.** • **The research was used by YW to assess whether it was economically efficient to propose improvements to particular service factors in the 2004 periodic price review and to enable YW to optimize the management and investment of its assets to the benefit of all stakeholders: customers and stakeholders** • **Stated choice experiments used to estimate benefits to water company customers of changes across 14 water service factors** • **Stratified random sample covered 1000 residential customers**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
					of river water, number of properties affected by odor and flies from sewage treatment works, increase of number of areas in which recreation an be pursued despite having wastewater discharges)	
5	**Yorkshire Water Services – Final Report Volume 1**	Accent Marketing & Research, November 2002	United Kingdom	See above		• **Identification of service measures and their attributes: comprehensive list of possible measures compiled by reviewing all relevant regulatory and internal measures in use, which were then prioritized by focus groups. For each of the highest priority measures, different potential levels of service were identified as follows: current level of service, lower level of service with no investment and two improved levels of service which could be achieved in five years period with differing levels of investment** • **Qualitative customer research to identify broad customer priorities for different service areas: test customers understanding of the service measure descriptions and to identify broad customer priorities. Eight focus groups meetings and twelve depth interviews** • **Quantitative customer research to value the monetary benefits of service using choice experiments: choice experiments were designed on the basis of the fourteen service measures (see above). Focus group pilot and quantitative fieldwork pilot to test methodology and customers' understanding. Then each customer carried out four choice experiments. Choice experiment contained three service options (including current level), each option included up to four service**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
						measures and a monetary value relating to change to customer's current annual water bill • **Changes to customer's annual water bill were randomly drawn from a range reflecting both cost of achieving the changed service level and overall willingness to pay revealed by customers during preliminary contingent valuation exercises**
6	**Customer-Responsive water and sanitation services,**	Osmo T Seppälä, Awwa-journal, June 2004	Finland			• **Questionnaire conducted as an adapted SERVQUAL survey, which seeks to compare customers' experiences and ideal expectations.** • **Theme interviews were held before** • **No research into willingness-to-pay.** • **Especially in communiction efforts of water companies there is a difference between experience and expectation**
7	**Quality of service and customer satisfaction**	Lluis Martinez Camps, Aguas de Barcelona, IWA publishing, 2000	Spain			• **Identification of attributes for each service was carried out by customers themselves, in working periods under the form of focus groups, and completed through personal in depth interviews with individual customers chosen to this end** • **First question about the importance the customer gave to each of the attributes of the corresponding services. Same time asking customers to valuate each attribute (assess customers' degree of satisfaction concerning each attribute. Together this renders a Customers' Satisfaction Index.** • **Linking CSI for each attribute to internal indicators (management indicators, internal dimension of pattern for measuring the quality of the service)**
8	**Perception of drinking water in the Quebec City**	Steve Turgeon, Journal of	Canada			• **Goal of the study is to investigate the influence of water quality and the**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
	region: the influence of water quality and consumer location in the distribution system	Environmental Management, 2004				**geographic location of consumers within a distribution system on consumer perception of tap water** • **Three perception variables were used to study consumer perception: general satisfaction, taste satisfaction and risk perception.** • **Data analysis based on logistic regression indicates that water quality variations (residual chlorine levels) and geographic location in the distribution system have a significant impact on the consumer perception** • **Study confirms the importance of socio-economic characteristics of consumers on their perception of drinking water quality** • **Few studies have tried to identify the driving factors behind drinking water consumption. Levallois *et al* (1999) established that consumer dissatisfaction with the taste of water and knowing the source of one's drinking water are both determining factors in consumer behavior.** • **Hudon *et al* (1991) emphasized that age, income and schooling influence risk perception.** • **Larson and Gnedenko (1999) demonstrated how decisions made in households about drinking water consumption are related to income, consumer opinion of water quality and location in the city** • **Satisfaction with the general quality and taste of drinking water does not necessarily mean that a respondent perceives no risk associated with tap water** • **Information on pipe diameters did not offer any conclusive results about the**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
						motivation behind consumer perception of drinking water • **Risk perception appears higher near the water treatment plant and when residual chlorine levels are higher.** • **Explanatory variables and categories for multivariate logistic regression: location, chlorine, pipes, age, education, source, income** • **According to the survey results, the variation in consumer perceived risk according to geographic location and residual chlorine levels could be in direct opposition to the variation of the real risk** • **"It is also important for managers to ensure that real risks are well understood by the population, so that perceived risks better reflect reality. This effort is important, because utilities are currently investing considerable resources and money to produce high quality tap water, but part of the population refuses to drink it.**
9	**Households' Willingness to Pay for Water Service Attributes**	David Hensher – University of Sydney Nina Shore – NERA Economic Consulting Kenneth Train – University of California, Berkeley, 2004	Australia	• Frequency of service interruptions (number of times water is unavailable) – 4 levels • Average duration of an interruption, expressed as length of time that water is unavailable each time that it goed off – six levels • Time of the day that water service is interrupted (time of	• Households willingness to pay to avoid a water service interruption depends on the number of the interruptions that customer faces per year, with willingness to pay being smaller when the customer faces more interruptions • Customers' willingness to pay to reduce the length of an interruption also depends on the length of the interruptions, which again indicates that they are willing and able to adapt • Residential customers: a strong preference to have water service	• **Stated choice experiments and mixed logit models to establish the willingness to pay to avoid interruptions in water service, differentiated by the frequency, timing and duration of these events** • **Prior to designing the survey, conduct a series of exploratory, qualitative group discussions to identify the salient aspects of the water and wastewater services** • **Information obtained during the focus groups was utilized to design the choice experiments, including which service attributes were included in the experiments, how the attributes were described, and the levels that each**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				the day that water is unavailable each time that it goes out) • Notification of the interruption, expressed as prior notification that water will be unavailable • Information service provided during an interruption, expressed as response to phone inquiries in the event of water becoming unavailable • Price, expressed as total water and sewerage bill for the year	interruptions during weekdays rather than on weekends • Customers greatly value having notice of an interruption when the interruption is planned • Results indicate that customers not only value minimal service interruptions, but also value other aspects of the service – those which perhaps traditionally receive less attention by water utilities. Attributes such as notification of an interruption, timing of planned service interruption, and the method of handling customer calles are all very important to customers	**attribute could take** • **Survey was conducted in two parts: initial recruitment interview and a choice experiment task. Sample was randomly generated from the telephone book. Choice experiments were mailed out to the respondents. The respondent was then contacted by phone and interviewed about the choice experiments** • **For drinking water the service options specified the following attributes (attitudes to and preferences for other service attributes – such as clarity and taste, fluoridation and chlorination of drinking water – were also discussed with customers in the focus groups. However, as these attributes did not arise as particular willingness to pay issues, they were omitted from the choice experiments)** • **Choice experiment was pretested twice: respondents were queried about their understanding of the terms, whether they felt they could meaningfully evaluate the service options, and their attitudes about the number and presentation of the choice experiments** • **Respondents need to believe that its answers have a non zero probability of affecting some outcome that matters to the respondent** • **Respondent might not be able to relate to the options that are presented, especially when the options differ greatly from anything they have experienced** • **There exists an innate tension in the use of stated preference experiments: usually stated preference experiments are utilized because historical data contain insufficient variation in attributes to allow estimation,**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
						and yet creating variation beyond that experienced historically can render the experimental results less reliable • **Possible tendency for respondents to prefer the status quo over changes in service levels in either direction, due to various factors including risk aversion, disutility of adjusting to change, and/or distrust of any suggested changes by a party such as the sponsor of the experiments who has a vested interest in the outcome** • **The attributes of each option were stated in absolute terms, rather than relative to the respondent's current situation**
10	**Using a choice modeling approach for customer service standards in urban water**	Darla Hatton MacDonald, Journal of the American Water Resources Association, June 2005	Australia			• **Are customers receiving the level of service they want and are they willing to pay for these higher service standards?** • **First, the role of experience with water service interruptions is explored in the choice process.** • **Second sensitivity to changes in annual water bills is tested using a different range of bid amounts in a subset of questionnaires** • **Investigating this question of WTP requires the use of a stated preference technique. New customer service standards, wherever they are set, will not be reflected by existing market data. This is because customer service standards in water are not well publicized and subject to only minor variations over time.** • **One approach to this lack of market data is to present a series of service level combinations to respondents as part of a sample survey and observe their most preferred responses → Choice modeling** • **Choice modeling and contingent valuation**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
						differ in that choice experiments allow the researcher to present many different combination of service options to respondents. Contingent valuation approach typically involves only one or two scenarios. Choice modeling addresses some criticisms of the contingent valuation method by providing a wider range of scenarios and structuring the experiment as a process of trading off the attributes. The main disadvantage lies in the cost of the research. **Steps in the process** • **Respondents were told that the research would help the industry and regulators better understand community expectations concerning water services** • **Questionnaires were administered by an independent market research firm using a drop off/pick up format to ensure that respondents were given time to think carefully about the questions** • **Choice sets were developed in consultation with industry representatives and focus groups** • **Two pretests were completed.**
11	**Consumer's willingness to pay more for municipal supplied water: a case study**	D.V. Raje etc., National Environmental Engineering Research Institute (NEERI), Ecological Economics 42 (2002)	India	• Consumers' satisfaction about water supply services • Beliefs in the system • Affordability towards increased water rates		• **Study aims at determining consumers' WTP more for improvements and identifying the factors affecting WTP** • **Primary objective of the study was to determine the factors (variables) and their influence on consumers' WTP: factors: consumers' satisfaction about water supply services, beliefs in the system and affordability towards increased water rates** • **Most widely used model in contingent valuation studies is based on logistic**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
						regression analysis • **Approach to quantify the satisfaction level of consumers relating to water supply service and describes the impact of various factors on WTP through logistic regression analysis** • **Two fundamental approaches used to analyze such issues.** • **Indirect approach involves observing consumers' behavior and modeling of behavior based on the approximate expenditure in terms of time and money to obtain the goofs or services** • **Direct approach: 'contingent valuation method' involves taking a survey through a structured questionnaire of consumers' WTP specified process for hypothetical services** • **Method has major advantages over the indirect method in that it can value services that are normally difficult to assess with the indirect method.**
12	**Asset planning for water reticulation systems – the PARMS model**	S. Burn, S. Tucker, M. Rahily *et al*, Water Science and Technology, Vol 3, No 1-2, pp 55-62, CSIRO 2003	Australia		• Customer preferences: 1. quality of supply 2. water supply continuity • Respondents were fairly accepting that water shut-offs are inevitable, but more so for shut-offs due to maintenance works than shut-offs due to a system breakdown • Most respondents were very or quite satisfied with the way the water shut off was handled • Most respondents were not willing to accept interruptions so supply of longer than 5 hours. The most frequently mentioned time was three to four hours that	• **Pipeline Asset and Risk Management System (PARMS) developed to allow analysis of the long term cost implications of a range of scenarios, such as different customer service requirements, different operational strategies or repair/renewal strategies** • **Griffin and Mjelde (2001) used Contingent Valuation Methods to examine the values people placed on the current and possible future water restrictions in terms of their strength and duration** • **Cost details are one of the critical components needed to allow planning models to work effectively and allow comparison of the costs of customer preferences**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
					customers preferred to have their water shut off • Two most convenient times nominated were between 10pm and 6 am and 9am and 4pm • Respondents felt less inconvenienced if they were given advance notice • Most respondents did not want to be compensated. They preferred water authorities to fix the problems	• **In the PARMS model statistical models are used to predict future failures for individual assets across the whole range of installation and operating conditions**
13	**Developing Customer Service Targets by Assessing Customer Perspectives**	AwwaRF, 2004	United States	• Bill problem resolution • Billing schedule • Hours of operation: field service • Appointment window: field service • Response time • Arrival etiquette • Professionalism: field service • Follow-up • Hours of operation • Authority of reps • Professionalism: customer service • Automated phone: customer service • Phone hold time: customer service • Line wait: customer service • Frequency utility communicates	**Importance weight (correlation between attribute and overall satisfaction)** 1. Resolve billing problem 2. Authority of representatives 3. Arrival etiquette 4. Response time: field service 5. Billing schedule 6. Professionalism: customer service 7. Phone hold time: customer service 8. Line wait: customer service 9. Professionalism: field service Optimal service model • Customer communication costs • Representative training costs Have the most impact per dollar invested	• **Focused on (customer satisfaction** • **Qualitative: focus groups** • **Quantitative: satisfaction survey: rate how satisfied they would be at different levels of service** • **Cost exercise: utilities were asked what measures they would take if they wanted to improve service (f.e. $ 70000 to reach satisfaction of 87% in stead of 82% for resolving billing problems → not calculated to increased rates!)** • **Optimal service model: linear programming approach: solving a set of equations to maximize or minimize a single value, such as satisfaction (sum of the satisfaction derived from each attribute of service)**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				• Water quality info schedule • Internet information		
14	**Utility Rate Structures: Investigating International Principles and Customer Views**	AwwaRF, 2005	United Kingdom (Case Study)	• Billing process (metered) • Written complaints • Response to billing contacts • Ease of telephone contact • Restrictions on use • Sewer flooding • Adequate pressure • Interruptions to supply	Most important reasons for dissatisfaction: • Drinking water quality (mostly aesthetics, not security) • Leakage • Water pressure Wishes • 2/3 of customers want compensation for unexpected supply interruptions of 12-24 hours, majority up to € 32,- • Customers expect between 1-3 days notice of planned interruption	• **Literature review** • **Case studies**
15	**Customer Research 2003: Periodic Review-National Report**	MVA in association with WRc	United Kingdom	• Maintaining water pipes, treatment works and reservoirs • Ensuring a reliable and continuous water supply • Ensuring the safety of tap water • managing the appearance, taste & smell of tap water • Managing the pressure of water in your taps and interruptions your supply • Handling customer accounts, complaints and customers with special needs	• General satisfaction with current drinking water and waste water services was high (67-89%, av. 79%) • More than half of the people perceived current service as fairly good, very good or extremely good value for money (37-71%, av. 55%) • About 18% (11-42%) were fairly, very of extremely dissatisfied with the current service level • Customers attached very high importance to maintaining the current levels of all areas of service delivery, and not allowing them to deteriorate. Some were considered more important than others: • The top two areas for improvement, without any additional costs, were 'improving	• **The survey collected attitudinal information on current services and proposed future water and sewerage services. Respondents were presented with information on current and proposed services using 'show cards' incorporating information by OFWAT and other regulators. These included details of proposed changes to current service levels, and their effects on bills.** • **Customers were asked how important they felt it was to maintain their current service level, for each of the ten service elements, in turn, rather than have it reduced. At this stage of the interview there was no reference to associated costs.** • **Customers were shown plans proposed by companies in their own area, and the associated costs of the proposals for 10 service areas.** • **Customers were asked if they would be concerned if the proposals they supported**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				• Maintaining sewers and sewage treatment works, ensuring the network can meet new demands and controlling smells from sewage works • Avoiding the risk of homes and gardens being flooded with sewage • Managing the amount of water taken from the environment to supply customers • Managing the effect of water company activities on the water quality of rivers, wetlands and coastal waters	the appearance, taste and smell of tap water' and 'drinking water quality/safety of tap water'. • The area of service delivery in the plans most supported by customers nationally was 'ensuring the safety of tap water'. • 'Managing the appearance, taste and smell of tap water' and 'ensuring reliable and continuous water supply' were the next most supported service elements. • 4 in 10 indicated they would be concerned, but half said they would not. • The service element which would cause most concern if delayed was drinking water quality	**were delayed to keep bills down.**
16	**2004 Periodic Review: research into customers' views**		United Kingdom	• Taste and smell of tap water • Maintaining safety of tap water • Appearance of tap water • Maintaining water and sewerage infrastructure • Pressure of water in your taps • Handling customers' queries • Smells from sewage works • Reliable and	• Urgency and worth paying more to improve preferences include maintaining quality of coastal and bathing waters, maintaining quality of river waters and protecting important areas of wildlife and plants **(mostly environment)** • Most urgent improvements are headed by tap water taste and smell Drivers of satisfaction with value for money (in order of importance first five): • Maintaining safety of tap water	**Qualitative stage** • **Focus groups: understand agenda, perspectives and views, understanding of unfamiliar terms and concepts** **Quantitative stage** • **Interviewers went to households. Sampling points made out of which representative quota had to be interviewed** • **Questionnaire development by market research institute** • **Questionnaire piloting** • **Face to face interviews with show cards** • **During fieldwork period no really significant water related events that could have impact on the findings**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				continuous water supply • Preventing bursts and leaks • Avoid risk of homes/gardens being flooded with sewage • Maintaining quality of river waters • Protecting important areas of wildlife and plants • Maintaining quality of coastal/bathing waters • Reducing hose-pipe bans	• Taste and smell of tap water • Maintaining water and sewerage infrastructure • Preventing bursts and leaks • Handling customers' queries Drivers of satisfaction (in order of importance, first five): • Taste and smell of tap water, maintaining safety of tap water, appearance of tap water, maintaining water and sewerage infrastructure, pressure of water in taps	
17	**Levels of service for the water industry in England and Wales 2003-2004 report**	OFWAT	United Kingdom	• Inadequate pressure • Supply interruptions • Restrictions on water use • Flooding from sewers • Billing contacts • Written complaints • Bills for metered customers • Ease of telephone contact		
18	**Statistical profile and performance benchmarking of water supply services in 32 major western australian towns**	Office of Water Regulation (OWR), Western Australia, 2001	Australia	• Continuity of supply • Supply interruptions • Water quality (complaints) • Water quality (microbiological)		
19	**Performance Indicators**	NORVAR,	Norway	• Customer		

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
	for Evaluation of Norwegian Water and Wastewater services	Watermarque Issue 2.6, April 2001		satisfaction • Quality • Reliability • Environment • Organization in-house • Economy		
20	**Performance Indicators for the Regulation of the Water and Sewerage Services: French experience**	ENGREF Laetitia Guerin-Schneider, Emmanuelle Brunet, 2005	France	• Rate of replies to letters in 15 days • Proportion of waiting letters among the replies on time • Existing connections efficiency • Analysis of number of complaints • Quality of supplied water • Rate of conformity in self-monitoring tests • Primary water losses per km • Primary efficiency of use of water resources • Mains failures • Water supply interruptions		
21	**Decision support tools for predicting the performance of water distribution and wastewater collection systems**	USEPA	Case study: United Kingdom	Customer service • Complaints (interrupted service, water taste, other, odor, water color, water pressure) • Number of new services connected		

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				• Service interruption time per customer • Properties affected by unplanned interruption (>6 hr) • Service interruptions (hosepipe bans, low flow restrictions, planned)		
22	**Comparing individual specific benefit estimates for public goods: finite vs continuous mixing in logit models**	Scarpa, R. Kenneth G. Willis and Melinda Acutt				• **Optimal supply level depends on consumer preferences and willingness to pay for alternative levels of joint supply of the private/public good package.** • **Such preferences can not be derived from market transactions because customers cannot shop around for different levels of provisions of the public goods associated with water supply** • **Alternative way to investigate these preferences is via statements of choice** • **Latent class modeling (finite mixing, LCM) approach may offer insights into the heterogeneity of consumer preferences that are not readily identifiable through a traditional mixed logit random parameter model, especially when here are reasons to believe that these are clustered around certain values**
23	**Customer Acceptance of Water Main Structural Reliability**	EPA			• 60% of survey respondents are willing to accept service disruptions of up to two hours; week day mornings worst time and evening second worst time to experience water service disruption • Service problems related to pressure, taste, odor, color and clarity are associated with a	

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
					lower level of trust in the utility as well as lower satisfaction. Disruption in water services does not have this impact on trust, reflecting an understanding that disruptions are a normal event	
24	**Dutch tap water**	PQR commissioned by VEWIN, 2004	Netherlands	Indicators with which the company will be evaluated (in decreasing sequence of importance): • Supply of reliable drinking water that meets the quality standards • Supply interruptions minimized • Nature conservation in water-collection area • Customer oriented service • Support of development of water collection in developing countries • Minimizing price of drinking water • Supply of soft drinking water	• Unknown on which elements a customer bases its trust and how the trust level can be influenced, in times of calamities • Consumers have a strong wish to leave everything as it is • Consumers find it difficult to separate their view on the quality of the water with quality of supply • One third of the respondents says the quality of the drinking water has to increase (majority woman) • Most important attributes of drinking water are: health and safety, then purity and taste, then odor and clarity/color. The least important attribute is softening. Constant supply of water and price are barely mentioned • Respondents don't want privatized water companies because this will not lead to lower prices and higher service. • A quarter of the respondents would like to get more information on their drinking water (majority woman)	
25	**Water Utility Customer Attitudes and Values: Insights from recent AwwaRF sponsored**	**Bob Raucher, Stratos Consulting**	**United States**		• **Utility offerings of POU related services were thought to be a good idea by 60% of respondents**	

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
	research				• Many customers want better quality in their homes, consumers want better tasting, potentially safer or more convenient water options • Most interested in learning about individual infrastructure repair projects that will affect them directly • Interested but less so in being told about the details of project work • Respondents preferred messages delivered directly to their homes • Would like to have the opportunity to give their utilities feedback about infrastructure renewal projects	

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
27	**1-mensuration liberalization energy market**	Consumentenbond, 2004	Netherlands	• Reliability of the supplier • Clarity of the bill • Customer-friendliness supplier • Ease of contact with supplier • Customer service supplier • General information supply • Handling complaints • Possibilities for switch to other supplier • Contract conditions • Information about outages • Price • Approach by new suppliers	• Reliability of supply is perceived as most important by the customers. • Hardly any of the indicators were judged to be of less importance	**The aspect on which customers were most satisfied, was also judged to be as most important. The aspect judged to be of least importance was the way of approaching by new suppliers. However, still 52% judged this to be somewhat important.**
28	**Monitor energy companies. Report mensuration I 2005**	Millward Brown Centrum commissioned by EnergieNed	Netherlands	• General satisfaction • General judgment of: o product offer o service o administer service o price/quality o reliability of supply • Contact with supplier during last 3 months and opinion on: o outages o billing		• **Both private customers and companies were questioned. Sometimes results differed for these 2 groups.** • **General satisfaction was mostly determined by undisturbed supply (81%)** • **General dissatisfaction was mostly determined by unclear billing (34%)** **Customer satisfaction is measured (almost) continuously in NL (!)**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				o handling moving customer o switch to other supplier o problem and complaint handling		
29	**Interruption costs, customer satisfaction and expectations for service reliability**	**Sullivan *et al*., 1996, IEEE Transactions on Power Systems**	**United States**			**Several conditions of outages were studied.** • **It was found that more and more electricity companies are facing diverging claims of customers, who want a high quality (and therefore a more expensive) service and customers who want a low quality of service with low costs.** • **It is important whether a customer is informed in advance about interruption of the supply. This determines the lost income, but also influence customer satisfaction.** • **In general costs are lower with increasing age of the customer. In households with children costs following from supply interruption are higher** • **Customer satisfaction is determined by the customer's perception of reliability of supply, not by the actual reliability.**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
30	**Networks in numbers 2004. Reporting trends in post and IT infrastructures 2004**	Ministry of Economic Affairs	Netherlands	• Frequency of mail delivery • Quality of mail delivery • Duration of mail delivery after sending • Vicinity of post offices • Vicinity of mail box	Duration of mail delivery after sending, frequency of delivery and price of stamps were found to be more important than vicinity of post office or post mail box	
31	**TPG Post, 2005**		Netherlands	• Accuracy • Easiness of sending and receiving mail • Service oriented + for company customers: process approach (sending large nr of pieces)		**The Dutch Post company measures satisfaction among private customers and small companies continuously, large companies twice a year.** **For the future daily research is planned, focusing on** - **general satisfaction** - **satisfaction about handling questions** - **satisfaction about handling information enquiries** - **satisfaction about handling complaints** - **professionalisms, friendliness, accuracy**
32	**Customer satisfaction measurement at Post Denmark: Results of application of the European Customer Satisfaction Index Methodology**	**Kristensen, K., Martensen, A., Grønholdt, L., Total quality management, Vol 11, no 7, pp 1007-1015, 2000**	**Danmark**	**The determinants of customer satisfaction are:** • **perceived company image** - **overall image** - **business practice** - **ethics** - **social responsibility** • **customer expectations** - **overall expectations of postal service** - **overall expectations of customer interaction** • **perceived quality**		**The European Customer Satisfaction Index (ECSI) links customer satisfaction to its determinants and, in turn, to its consequence, namely customer loyalty.** **Data collection was performed in three different ways:** - **a direct postal survey** - **a postal survey with pre-notification** - **a telephone survey** **Image was by far the most important factor when it comes to the generation of loyalty and satisfaction.**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				- overall evaluation of quality experience - meeting the customer's requirements - comparison with competitors • perceived value - value for money - comparison with competitors • customer satisfaction - overall satisfaction - fulfillments of expectations - comparison with ideal • customer loyalty - intention to buy again (remain a customer) - intention to by additional postal services - intention to recommend		

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
33	**Internetsite NS**	NS	Netherlands	• Connection public transport to train • Connection train to train • Approachability of personnel in train (within 30 min.) • Approachability service personnel (visible presence) • Handling money refunding • Handling complaints • General judgement traveling by train • Shelter on platforms • Signposting at station • Capacity parking lots • Frequency of trains • Information available at home • Information in the train during arrival • Information in train during deregulation (reporting during disorder) • Information at station during deregulation (reporting during disorder) • Quality of guarded bike shed • Quality unguarded bike sheds • Possibilities for purchasing tickets • Train in time • Surveyability station • Value for money train trip • Cleanliness train (sufficient) • Cleanliness station • Cleanliness window • Travel information during arrival (info broadcasted) • Travel and seat comfort in train		

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				• Security station during daytime • Security station at nighttime • Security in train • Train taxi • Audibility station intercom (sufficient) • Audibility train intercom (sufficient) • Heating & ventilation train • Friendliness train personnel • Friendliness station personnel • Waiting at ticket office (queue < 7 persons) • Waiting at ticket automat • Seating capacity train		
34	**A handbook for measuring customer satisfaction and service quality, TCRP report 47**	**NRC, Transportation Research Board**	**USA**	**Determinants of service quality:** • **Reliability (consistency of performance & reliability)** • **Responsiveness (willingness/readiness of employees to provide service, incl timeliness)** • **Competence (possession of required skills & knowledge)** • **Access (approachability and ease of contact)** • **Courtesy (politeness, respect, friendliness of personnel)** • **Communication (keeping customers informed & listen to them)** • **Credibility (trustworthiness, believability, honesty)** • **Security (freedom form danger, risk or doubt)** • **Understanding/knowing the customer (making effort to understand the customer's**		**Regardless of what eventual quantitative analytical approaches are used, the process must begin with acquiring a list of service attributes from the customers, through an exhaustive 'listening to the voice of the customer' process. This qualitative research is usually conducted through a series of focus groups. Customers are requested to describe the ideal service or product in all of its feature details** **Then customers are asked to list their basic service or product requirements., starting with primary requirements and continuing through the secondary and tertiary components of each of these requirements. The moderator proceeds until the group has exhausted all the possible attributes of service quality they would consider.** **This process is repeated at multiple geographic and customer segment sites and the results are combined and itemized**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				needs) • Tangibles (physical environment and representations of service) • (see publication for extensive list of measures)		into a full and complete attribute listing. The wording of the attributes is refined for clarity and linkage with expected results. To extract and prioritize customer service quality requirements focus group sessions can then be held

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
35	**An integrated framework for service quality, customer value, satisfaction: evidence from China's telecommunication industry** ***Information systems frontiers, 6:4 325-340, 2004***	**Wang, Y, Lo, H.-P., Yang, Y.**	**China**	• **Tangible (visually appealing product, employees neat in appearance)** • **Reliability (make & keep promises, solve problems customers)** • **Responsiveness (prompt service, willing to help)** • **Assurance (customers feel safe in transactions, employees instill confidence in customers)** • **Empathy (provider gives individual attention, understand customer's needs, convenient operating hours)** • **Network quality (chosen network quality is always good, call quality is good)** • **Customer perceived service quality (excellent overall service, high quality offerings)** • **Customer perceived sacrifice (price charged, time required to obtain offerings, effort needed to receive offerings)** • **Customer value (offerings are value for money, offerings are worth the time, effort and energy spent to require them, provider is good choice compared to competitors)** • **Customer satisfaction (satisfied with service, pleased with delivered service)** • **Behavioral intentions of customers (likeliness of**		**Article mainly describes hypothetical model to measure customer satisfaction. Several hypotheses have been developed to identify construct that determine customer satisfaction. Each construct contains several items.** **In order to collect enough data to test the hypotheses, a face-to-face customer survey was conducted.** **Subjects were asked to assess items of different constructs, based on a seven-point scale. The descriptors ranged from strongly disagree, somewhat disagree, slightly disagree, neutral, slightly agree somewhat agree and strongly agree.** **It was found that not all quality-related factors contribute to customer perceived service quality, customer value and customer satisfaction equally.**

	Article/Report	Author	Country	Indicators	Customer preferences	Methodology
				repurchase, recommend, keep close relationship with provider)		

	Article/Report	Commissioner	Executed by	Indicators	Customer preferences	Methodology
36	**Benchmark Dutch drinking water industry**	VEWIN, 2003		Service • billing • meter reading • change of watermeter • maintenance • moving • solving of supply problems	• 21% of the customers is willing to pay for a higher drinking water quality • 6% is willing to accept a lower drinking water quality for a lower price • 38% of the customers is willing to pay for softening of their drinking water	**Telephone survey**
37	**Softening in Bovelingen**	VMW, 2005		• Softening	• 90% of respondents thinks the water company should arrange for softening of drinking water • 62% of the respondents is willing to pay more for that • Lowest extra payment, 5 euro per year, highest 400 euro per year	**Telephone interviews. What is the customer willing to pay for softening of drinking water?**
38	**Customer satisfaction survey**	Hydron Flevoland, 2005	Wisdom groep			**Survey to test client satisfaction with the service of Hydron Flevoland. Satisfaction is measured of the service during contact moments: telephone, letter, changing address, supply interruption, change of meter, billing in which using contact moments**
39	**Name and image survey Hydron Flevoland**	Hydron Flevoland, 2005	TNS NIPO		Most important attributes that determine client satisfaction: 1. Quality of services 2. Solve problems quickly and comfortably 3. Quality of drinking water 4. Delivery of drinking water without interruption 5. Information on actual news Most satisfied with: 6. Quality of drinking water	**Computer Assisted Telephone Interviewing**

	Article/Report	Commissioner	Executed by	Indicators	Customer preferences	Methodology
					7. Delivery of drinking water without interruption 8. Solve problems quickly and comfortably 9. Quality of services 10. Information on actual news	
40	**Water use at home 2004**	Hydron Flevoland, 2005	TNS NIPO			**Questions via e-mail, reporting of daily water use in a water diary**
41	**Customer perception**	Brabant Water, 2005	Brabant Water			**Internal investigation of customer perception of the drinking water company using four scenarios for the future.**
42	**Customer satisfaction indicators – qualitative survey**	PWN, 2004	Eveline Vermeulen - Marketingcommunicatie	• Knowledge of customer of tasks PWN • One contact point within the PWN organization • Price for contractor • Dissemination of information • Problems with temporary connections • Pressure of the drinking water for companies • Opening hours customer information centre • Having a shop for customers • Information on construction of water price • Diversity of nature • Suffering from nature restoration projects • Visibility of ranger • Enforcement of rules for customers	**Big companies** • Better communication on necessity of inspection of installations • Confirmation of results inspection and execute checks on adaptations of drinking water installations on the basis of inspection • Give advice on legionella and prevention of legionella. Clear information and guidelines expected from PWN • Correct and complete address on bill • Send the yearly bill on time **Building companies** • Shorter response time between application and connection of a customer • Confirmation of appointments, applications, complaints • Write down transactions in	**Qualitative interviewing and group discussion with business customers to determine relative importance of satisfaction indicators**

	Article/Report	Commissioner	Executed by	Indicators	Customer preferences	Methodology
				• Serviceability of ranger • Suffering from PWN building traffic • Entrance fee	case of temporary connections in order to prevent mistakes • Clear use of relation number, user address and billing address on bills • Create a special treatment for building companies when calling the call centre • Overview of the distribution area and contact persons **Housing corporations** • Confirmation of appointments, applications, complaints • Quicker processing of mutations and requests • Give advice on legionella and prevention of legionella. • Change of forms that house renters have to fill in when moving • Send a credit bill **Visitors of PWN nature areas** • Increase visibility ranger • Create separate are for mountain bikers in the dunes • Clear signs with walking distances • Information signs on interesting spots • More information for children older than 10 in customer information centre • More profound information in customer information centre	

	Article/Report	Commissioner	Executed by	Indicators	Customer preferences	Methodology
43	**Customer satisfaction survey**	PWN, 2004	TNS NIPO		• Contact moments are for business customers the most important moments on which to influence customer satisfaction • For household customers, service is the most important aspect that influences satisfaction	**Households, via database, interview via internet** **Businesses, via telephone interviewing**
44	**Zero mensuration customer satisfaction**	PWN, 2004	Grasstek Consultancy & Research		Relative importance of aspects that determine household customer satisfaction (in sequence of importance) 1. Service 2. Contact 3. Communication 4. Bill 5. Nature conservation 6. Products and service 7. Price	
45	**Image service Water Company Groningen**	Water company Groningen, 2003	NIPO		• Answering and transferring phone calls must improve • Important to keep promises (appointments etc)	**Telephone interviews. Questioning about: solving failures, maintenance, moving, change or placement of water meter, meter reading, billing**
46	**Image water companies**	Water company Groningen, 2000	NIPO		• Willing to pay for development projects (70%) • Willing to pay for nature conservation (72%) • Willing to pay for softening (63%)	
47	**Competition between water companies damages trust of the consumer**	Hydron Zuid-Holland (Oasen), 2003	TNS NIPO		• Importance primary tasks drinking water company starts with quality, followed by continuity and then price • Importance of secondary tasks starts with investments in new developments,	

	Article/Report	Commissioner	Executed by	Indicators	Customer preferences	Methodology
					followed by extra capacity in times of drought and then replacement of pipes	
48	**Customer satisfaction survey**	Hydron Zuid-Holland, 2003		Indicators used in benchmark water companies for benchmarking 'service': • Telephone contact • Contact by mail • Contact in case of moving • Billing • Contact in case of failures • Changing water meter • Meter reading		
49	**Image water company Amsterdam**	Water company Amsterdam (WaterNet), 2004	O&S (Dienst Onderzoek & Statistiek, Gemeente Amsterdam)			**Telephone interview**
50	**Service level water meters (customer satisfaction on service level)**	**Water company Amsterdam, 2005**	**O&S (Dienst Onderzoek & Statistiek, Gemeente Amsterdam)**	• **Water conservation** • **Dissemination of information regarding water meter** • **Placement of water meters by mechanic** • **Advance billing** • **Telephone contact**	• **Advance billing and telephone contact are services which need improvement** • **Placement of water meters by a mechanic is an important indicator for the overall satisfaction of the customer. Taking into account of special wishes, answering questions and tidiness have significant influence on overall opinion.**	**Telephone interview**

III Contingent Valuation Techniques

There are several formats to elicit WTP by means of CV (Bateman *et al* 2002):

- open-ended,
- bidding game,
- payment card,
- single bounded dichotomous choice,
- one and a half bounded dichotomous choice,
- double bounded dichotomous choice, and
- randomized card sorting procedure.

- The *open-ended* direct elicitation format straightforwardly asks respondents for the value they place on the change of some good or service attribute (their maximum WTP). This format is very informative as maximum WTP can be identified for each respondent and requires relatively straightforward statistical techniques. Because the respondent is not given any clues about the possible value of the change, there is no anchoring bias.

  Problems that arise when using open-ended questions are large non-response rates, protest answers, zero answers, outliers and generally unreliable responses. Reasons for these are that it might be difficult for respondents to come up with their maximum WTP for something they are unfamiliar with, or have never thought about valuing before. Moreover, respondents are likely to make decisions on daily market transactions based on fixed prices, rather than stating their maximum WTP values. For the reasons mentioned here, open-ended direct elicitation formats have been abandoned by CV practitioners.

- In the *bidding game* approach respondents are faced with several rounds of discrete choice questions, with the final question being an open-ended WTP question (similar to an auction). Respondents are asked whether they are willing to pay a certain amount, and then additional or reduced bids, depending whether they responded positively or negatively to the initial bid, until their maximum WTP is reached. This format is prone to a starting or anchoring bias, which refers to the respondents being influenced by the starting values and succeeding bids that are presented to them. Other disadvantages are the large number of outliers (unrealistically large bids) and 'yea-saying' (respondents accepting the proposed amounts to avoid having to say no which can be experienced as socially embarrassing). Although most widely used in the 1970s and 1980s the format cannot be used in (e-)mail surveys or other self-completion formats.

- To address the problems arising from the open-ended and bidding game formats, the *payment card* or ladder approach was developed. The respondent is presented with a visual aid (in the form of a card)

containing a large number of monetary amounts, providing a context for their bids to facilitate the valuation task. At the same time, anchoring bias is avoided and the number of outliers is reduced. Some versions of the payment card contain benchmarks; they show how the values in the card relate to actual household expenditures or taxes. Nevertheless, biases relating to the range of numbers used in the card and the location of the benchmarks form disadvantages for this format.

The payment card approach cannot be used in a telephone interview, however, a telephone variant does exist. The telephone variant sequentially names WTP intervals (starting with the lowest interval first) and asks the respondent to call for a stop when their WTP lies in the stated interval. Unfortunately, this does not provide any protection from yea-saying.

- *Single-bounded dichotomous choice* or referendum methods were designed to simplify the cognitive task for the respondent and became increasingly popular in the 1990s. In this format, respondents only have to make a judgment about a given price, like they do when they decide whether or not to buy something in the supermarket for a certain price.

  The approach provides incentives to state the truthful WTPs because of the similarity with the choices consumers are presented with in everyday life. It is a natural decision to accept if their WTP is equal to or greater than the price asked and to reject if it is not. Despite the advantages of low non-response rates and the avoidance of outliers, the close ended single bounded dichotomous choice method results in substantially larger values compared to the results of open-ended questions. Here, the problem of 'nay-saying' contrary to 'yea-saying' arises. Nay-saying typically happens when respondents protest as they do not believe the government can actually provide the good. In this format nay-saying is likely to characterize a larger fraction of the respondents than yea-saying. Moreover, less information per respondent is available (only whether WTP is below or above a certain amount), which requires larger samples and stronger statistical assumptions. This makes the research more expensive and more sensitive to the assumptions made.

- The *one and a half dichotomous choice* procedure presents respondents with the initial information that costs of providing the good in question will be between $ X and $ Y (X < Y), with the amounts of X and Y being varied across the sample. Respondents are then asked whether they are prepared to pay the amount of $ X or $ Y.

- *Double-bounded dichotomous choice* formats elicit more information about each respondent's WTP than single-bounded choice formats (what they are WTP and what they certainly are not WTP) however,

the limitations of the single-bounded procedure still apply to the double-bounded one. Also, there is a possible loss of incentive compatibility as respondents can get annoyed by the second question that may seem to be repeating the choice situation. Anchoring and yea-saying biases may occur as well.

IV Choice Modelling Techniques

Choice Modelling includes the techniques:

- Choice experiments (CE)
- Contingent ranking (CRK)
- Contingent rating
- Paired comparison

- *Choice Experiments (CE)*

One example of the use of CE to elicit customer preferences can be found in Australian literature. A study performed by Hatton MacDonald *et al*, from CSIRO (2003) investigated customer preferences for the purpose of new customer standard setting regarding continuity of supply in the Australian water industry. Lack of market data called for a SP approach. As part of a sample survey choice sets with alternative service levels were presented to respondents in Adelaide, Australia. In Figure 17 an example is given of the choice set displaying five attributes, each varying on three levels (resulting in $3^5 = 243$ potential combinations of attribute levels).

The results of the study showed that increase in annual water bill and the frequency of future interruptions were considered the most important attributes of the presented choice sets. Unimportant attributes appeared to be the provision of alternative water supply in case of supply interruptions, and notification of the interruption. Moreover, it turned out that people are willing to pay positive amounts to achieve fewer water supply interruptions. Interestingly, a CE study performed by Hensher *et al* (2005) in Canberra (see also Figure 20) showed that the respondents greatly valued having notice of a planned interruption. The attributes of both studies were gathered through organized discussions in focus groups with consumers. This illustrates how different conclusions can be arrived at quite easily and that these techniques will not give access to one truth.

	Column A (current practice)	Column B	Column C
Without warning your house might be without water from ...	5:30am to 11:30am (ie **6 hours**)	5:30am to 9:30am (ie **4 hours**)	5:30am to 7:30am (ie **2 hours**)
In the last year, your water supply has **never** been interrupted. The water supply company tells you that your water supply might fail ...	**Two more times** in the next 12 months	**One more time** in the next 12 months	**No more times** in the next 12 months
You are advised about the interruption by …	A **card** put in your letterbox **after** the interruption	A **phone call** to let you know what was happening	A **knock** on your door by a company representative
The **alternative water supply arrangements** offered were …	**None** unless you requested it	Water was provided at **a central location** (water tanker in the street)	A **2 litre bottle of water** was delivered to every household where someone was at home
As part of the package your annual water bill will ...	**Stay the same**	Increase by **$40**	Increase by **$80**
	☐ Column A	☐ Column B	☐ Column C

☐ Don't know

Figure 17 Complete array of attributes and levels of customer service in a study [Source: Hatton MacDonald et al, 2003]

Pros and cons

CE provides a natural way to value multiple service attributes, because more than two alternatives are considered. If the same valuations were to be obtained with CV, different valuation scenarios for each level of each attribute would have to be presented to the respondents and analyzed afterwards. This would be too demanding and too costly. Also, marginal value changes in the levels of service attributes are measured more reliably with CE than CV techniques. Another advantage of CE over CV is that it is considered to yield better results, less prone to yea-saying with a much less demanding mental task. Open-ended CV designs which are the best CV option to avoid yea-saying are viewed as cognitively demanding, which can lead to higher non-response.

- *Contingent RanKing (CRK)*

When using CRK, respondents are asked to rank three or more alternatives from most to least preferred (see Figure 18). It is essentially the same as in CE, but instead of choosing one scenario, the respondent is asked to rank the scenarios. Examples of studies can be found in the valuation of environmental goods, including improved air quality (Rae, 1983), improved water quality (Smith & Desvousges, 1986).

Wetland management survey

Please rank the three alternatives below, from most to least preferred by placing the numbers 1, 2 and 3 in the boxes below:

	Alternative 1	Alternative 2	Alternative 3
Water quality	fair	good	poor
Number of waterbirds	50,000	100,000	50,000
Area of wetland	60,000 ha	60,000 ha	20,000 ha
Household cost	$40	$70	$10
	☐	☐	☐

Figure 18 Example of a contingent ranking survey [Source: Morrison et al, 1996]

Pros and cons

CRK allows for estimation of part-worths as well as the aggregate value of goods or services. A drawback of this approach is that it does not provide the respondent with a possibility to express opposition to payment other than to give a low ranking.

- *Contingent RaTing (CRT)*

In CRT the respondent is presented with an option as a scenario and asked to give it a rating on a semantic or numeric scale (see Figure 8). The same respondent is then presented with a different scenario and asked to rate that. In Figure 19 an example of a CRT task is presented. For each of the exercise types counts, that they can also be mixed with other forms, or extended.

On the scale below, please show how strongly you would prefer the following policy option.

Characteristics	*Option 1*
Native woodland	500 ha protected
Heather moorland	1200 ha protected
Lowland hay meadow	200 ha protected
Cost per household per year in additional taxes	£ 25

1 2 3 4 5 6 7 8 9 10

Very low preference Very high preference

Figure 19 Example of a contingent rating task [Source: Bateman et al, 2002, p. 256]

Pros and cons

The main con for CRT, is that the methods are doubted to be in line with economic welfare theory. Compatibility with economic welfare theory enables measuring in terms that are comparable to and rooted in common economic practices (e.g. CBA).

- *Paired Comparison (PC)*

PC proceeds similar to choice experiments with pairs of scenarios, but instead of merely saying which option they prefer, respondents are asked to indicate their strength of preference for their choice. In Figure 20 an example is given of a choice experiment that can be used for PC.

Pros and cons

The main con for PC, similar to CRT, is that the methods are doubted to be in line with economic welfare theory. Compatibility with economic welfare theory enables measuring in terms that are comparable to and rooted in common economic practices (e.g. CBA).

Paired comparisons yield best results when the number of objects to be compared is small, as respondent fatigue may occur. Problems that are known include violations of the axioms of transitivity, order bias, no allowance for indifference between objects, and the fact that respondents dislike both objects. The transitivity axiom states that if A is preferred to B and B is preferred to C, then A should be preferred to C. Order bias may occur when the questions are in a particular order.

	PACKAGE A	PACKAGE B
Number of times water is unavailable to your home:	1 time per year	2 times per year
Length of time that water is unavailable to your home each time that it goes off:	8 hours	5 hours
Time of day that water is unavailable to your home each time that it goes off:	Over the weekend	Mon-Fri sometime after 8am
Prior notification that water will be unavailable to your home:	1 day	2 days
Response to phone inquiries in the event of water becoming unavailable to your home:	You get straight through to a PERSON - you are not put on hold and there is no machine directing you to press buttons	You get straight through to a PERSON - you are not put on hold and there is no machine directing you to press buttons
Total Water & Sewerage bill for the year:	**$800**	**$850**

YOUR DECISION: If these were the only 2 options available to you, which option would you choose: Package A or Package B ?

Figure 20 Example of a choice experiment question that can be used as a paired comparison task [Source: Hensher et al, 2005]

V Integrating Consumer Preferences in Policy Decision Making

Recent concerns about the wisdom of relying on WTP studies as the sole indicator of likely consumer response to policy options has lead policy decision researchers to investigate alternative approaches to include assessments of public preferences in their decision making (Stagl, 2007). Four approaches to integrate preferences into policy option evaluation are discussed briefly below.

V – 1 Deliberative monetary valuation

Based on more general deliberative approaches to public consultation and choice this procedure involves panels of citizens to discuss information about the policy options under consideration (Spash, 2001). Citizens effectively form a jury and receive (and can call for) evidence with the aim of getting agreement on the monetary values of the available options. The panelists may also add new options if such become apparent during the process.

The principle idea underlying this process is that individual panelists may not have thought particularly carefully about the values they place on the options before and thus the agreed values at the end of the process ought to be more considered, evidence-based and rational than those that might have been achieved via standard WTP/WTA studies. In this sense the values can be thought of as being constructed as a consequence of the deliberative process. Indeed it is possible to combine WTP data collection before and after deliberation to explore how values have changed as a result of the deliberative process. Alvarez-Farizo & Hanley (2006) conducted such a study in the context of water quality improvements under the Water Framework Directive and found considerable change in valuation occurred as a result of the deliberative process.

This approach is based on the same general principles as those underlying WTP studies and assumes that all values can be made commensurate. The goal remains the elucidation of monetary values that will ultimately indicate the most valued option.

V – 2 Social multicriteria evaluation

This is a multi-stage procedure in which the researchers initially define a set of policy options by interviewing stakeholders, organizing focus groups with various publics and reviewing the relevant literature. Next a set of criteria is developed to represent the different views on how these options should be appraised and valued and create a matrix (an impact matrix), which evaluates each option against each criterion. A weighting is then assigned to each criterion to indicate its relative importance. An algorithm (there are a number

of these, see Stagl, 2007) is applied which evaluates each option under all the criteria and produces a rank ordering of the options. This is then presented back to the stakeholders (including potentially the publics) who can review the process and suggest changes. As this is an iterative process, stakeholders involved will learn during the process (Munda, 2004).

All stakeholders involved have to agree on the criteria used even if they disagree on the relative importance of each one. With deliberative valuation the values involved are assumed to be commensurable. This procedure involves some relatively complex algorithms and is difficult to follow if one is not familiar with the processes. As a result it is usually easier for stakeholders to be involved effectively in this process than for the lay citizenry.

V – 3 Three-stage multicriteria analysis

The three-stage multicriteria analysis is a related technique which starts with stakeholder groups representing different interests. The stakeholder groups generating concerns about each policy option and criteria against which they should be evaluated. Experts then put the policy options in a form in which it is possible to measure each option and then assess each option against all criteria (again, sophisticated algorithms may be used to achieve this). A citizen panel, or multiple panels, then review the evidence and consider these against their own preferences and values. Where there is disagreement between the expert analysis and the panel's view these are explored before a final recommendation is made. At this third stage panelists can add new values to the existing set and even change the options in the set if appropriate. Finally each criterion is given a relative weight and utility scores are calculated for each option.

While the ultimate goal is the selection of the 'best' option – the option with the highest utility score - the process highlights where citizens differ in their valuations from experts and stakeholders which itself can be of great informative value to those who will have to implement the policy. The technique by which the experts themselves value each option against each criterion (a kind of Delphi technique, Webler *et al*, 1991) is also designed to highlight the degree of uncertainty that exists between experts. Nonetheless the technique is based on the assumption that experts are likely to have a good understanding of the impacts of each option. The technique is not well suited for issues where there is uncertainty about outcomes. This technique assumes commensurability of values.

V – 4 Deliberative mapping

As with the other procedures in this section deliberative mapping is a multi-stage procedure:

- Interviews with stakeholders and experts elicit views about policy options and criteria against which they should be assessed.
- The researchers develop a set of evaluation criteria and core policy options which the stakeholders and experts are asked to consider.
- They are then asked to assess the performance of the various options under different conditions (e.g. most conditions favourable, most unfavourable) so as to gain an assessment of the degree of uncertainty of likely outcomes should each option be adopted.
- During the scoring procedure experts and stakeholders appraise the options using a formalised software-based procedure which produces graphical outputs to facilitate further discussion. Simultaneously group discussions with citizens consider the same material and agree a set of criteria for a later citizen panel to use to evaluate each option.
- The panel then scores the options and decides what issues need to be discussed in a forthcoming meeting with experts and stakeholders.
- The final workshop involving all participants is intended to highlight where there are differences between experts, stakeholders and citizens both in terms of the ranking of the options and in the different criteria used. More details on how Deliberative Mapping studies are conducted can be obtained from Davies *et al* (2003).

This procedure, rather than attempting to narrow down the available options in order to select the 'best' option, highlights areas of disagreement and uncertainty. This allows all parties to question the assumptions underlying their evaluations and is ideally suited to situations where there is a lot of controversy and value judgments will necessarily have to be made. The technique does not assume that values are commensurable and indeed, part of the purpose of the approach is to identify why and where values clash and cannot simply be traded.

V – 5 Overview

The above techniques, along with others that do not directly involve consumer/citizen input, are reviewed thoroughly by Stagl (2007). The four discussed here are part of a general move toward greater citizen participation in policy making and away form a paternalistic 'experts and government know best' approach to governance.

As many procedures rely on citizens' devoting time to participate there are important issues about inclusiveness to address. Ultimately the assumption is going to be made that any values or preferences revealed by these procedures will represent those of the citizenry as a whole. Thus, the representativeness of participants is key to the success of the exercise. Selection of an unrepresentative set of participants may lead to wrong conclusions.

Unfortunately two sets of pressures operate against achieving representativeness. The first is that these procedures are quite labour and time intensive, considering the need to include several hundreds of participants to ensure representativeness. Inevitably some groups' views and values will not be considered and much will rest on an informed selection of those participants that are included in the study. Secondly, participants are required to devote a considerable amount of time and effort to help consider policy options that may not be of much intrinsic interest to many people in the population. There is a concern that those who are prepared to devote the necessary time and effort may already be those who have an interest in, and thus strong views about, the policies and issues at stake. Research on the seriousness of these potential biases has yet to be completed.

VI Indicators used in Dutch consumer related research

In the following, the indicators used in a variety of Dutch consumer related studies are depicted (in Dutch). It can be seen that in different studies, diverse method and indicators are used to assess satisfaction and preferences.

Factoren klanttevredenheid
Kwalitatief onderzoek, 2004
4 klantgroepen (grootzakelijk, woningcorporaties, aannemers, bezoekers) in totaal 19 mensen.
12 single interviews van 1 uur met 4 woningcorporatie, 4 aannemers, 4 grootzakelijk gebruikers
7 groepsgesprekken van 2 uur

Indicatoren

- vertrouwen in watervoorziening / kwaliteit
- tevredenheid over contacten
- vertrouwen in kwaliteit levering
- kennis over en belangstelling voor de kosten per kuub,
- interesse in opbouw kosten.
- bereidheid meer te betalen voor extra advies t.a.v. kosten- cq.
- administratie en facturering
  - volgens afspraak
  - foutloos
  - op tijd
- responssnelheid
- minder fouten
- vertrouwen technische kwaliteit
- klachten

NB
Onderzoek is puur indicatief; kwalitatief, slechts een toets op reeds eerder geïnventariseerde klanttevredenheidsfactoren

Klanttevredenheidsonderzoek voor verschillende service-aspecten
Internet survey, 2005
Uitgenodigd: 1360; respons: 374 (30 %)

Indicatoren
Service beoordeeld d.m.v. rapportcijfer voor:

- telefonisch contact
  - tevredenheid
  - inlevingsvermogen medewerker kc
  - deskundigheid medewerker kc
  - behulpzaamheid medewerker kc
  - snelheid telefoon beantwoording
- schriftelijk contact
  - mate waarin probleem opgelost werd
  - snelheid antwoord
- verhuizing
  - duidelijkheid (begrijpelijkheid/overzichtelijkheid)
  - welkomstbrief
  - snelheid verwerking verhuizing
  - juistheid gegevens welkomstbrief
- storing
  - wijze waarop werkplek door monteur werd
  - achtergelaten
  - deskundigheid medewerker kc

- snelheid en wijze waarop storing werd afgehandeld
- deskundigheid monteur

➢ meterwisseling
- wijze waarop werkplek werd achtergelaten
- wijze waarop afspraak werd gemaakt (toon,duidelijkheid, tijdigheid)
- wijze waarop monteur begroette en zich legitimeerde
- deskundigheid monteur
- mate van informatievoorziening over reden en eventuele gevolgen meterwisseling

➢ meterstand doorgegeven
- mening over brief/kaart verzoek meteropname

➢ jaarafrekening
- duidelijkheid (v. toelichting, berekening, etc.)

➢ dienstverlening
- tevredenheid hierover

NB
Er wordt wel gevraagd hoe tevreden mensen zijn over bepaalde punten van de dienstverlening, maar niet hoe belangrijk / relevant mensen die indicatoren vinden. Er is geen verantwoording gegeven van waarop de operationalisatie gebaseerd is.

Klanttevredenheidsonderzoek
Klanttevredenheid: Inventarisatie van (on)tevredenheidsfactoren plus beleving hiervan van de verschillende klantgroepen d.m.v. kwalitatief onderzoek, 2004

Waardering op sleutelfactoren:

➢ contact
- vriendelijkheid
- deskundigheid medewerker
- nakomen afspraken)
- duidelijkheid antwoord
- begrip tonen voor situatie
- snelheid antwoord
- toonzetting e-mail
- aantal keren telefonisch doorverbinden

➢ telefonische bereikbaarheid

➢ back office / dienstverlening
- snelheid afhandeling verzoek of probleem
- verwerking van betalingen
- snelheid aanpassen persoonsgegevens
- snelheid doorvoeren adreswijziging
- informatie over vervolgacties
- snelheid verwerking aangepast ter mijnbedrag
- bevestigen van aanvragen of afspraken
- gemak doorgeven meterstand
- reactie op bezwaarschriften

➢ communicatie algemeen

➢ prijs

➢ producten en diensten

➢ natuur en recreatie

➢ techniek

➢ factuur

NB
Er is voorafgaand aan dit onderzoek een inventarisatie gemaakt van relevante factoren, welke is getoetst aan de beleving van de klant.

Klanttevredenheidsonderzoek particuliere en zakelijke klanten
Kwantitatief klanttevredenheidsonderzoek over performance, naamsbekendheid en imago, 2004
Particulieren die geen contact gehad hebben n = 250
Particulieren met contactervaring n = 69
Kleinzakelijk n = 120
Grootzakelijk n = 100
Woningbouwcorporaties n = 26
Aannemers en bouwbedrijven n = 30

Indicatoren

- dienstverlening
- producten & diensten
- facturen
- contact
    - afspraken nakomen
    - sneller reageren op vragen of problemen
    - meer begrip tonen voor situatie v.d. klant

sneller juiste persoon aan de tel

NB
Klanten die contact hebben gehad blijken algeheel op alle punten net iets minder tevreden te zijn. Misschien heeft dit te maken met de stemming – als die verandert door oneindig doorverbinden, onbeschofte behandeling, o.i.d., kan dit waarde oordeel over tevredenheid beïnvloeden (bron: NRC handelsblad 16 en 17 september 2006, p. 45: Leids onderzoek naar de mening van burgers over de aanpak van het klimaatprobleem door het ondergronds opslaan van het broeikasgas CO2 wijst uit, dat als de burger van tevoren niet goed wordt geïnformeerd over de technologie en het nut, zijn oordeel meeschommelt met zijn stemming. Willem Saris heeft met een experiment over de mening van burgers over het Veto-recht van EU-lidstaten tevens aangetoond dat de mening van de burger verandert afhankelijk van de informatie die hij van tevoren krijgt of vraag die gesteld wordt (framing effect).

Consumentenvertrouwen, wensen en behoeften en de kennis en het belang van de prijs van water
Onderzoek naar consumentenvertrouwen, wensen & behoeften, kennis van en het belang van de prijs van water, 2004
Deskresearch, groepsdiscussies met consumenten, kwantitatief consumentenonderzoek

- Kraanwater algemeen

Kraanwater = vanzelfsprekend altijd aanwezig, men maakt er zich nauwelijks zorgen over, water wordt gezien als belangrijkste levensbehoefte.
Kraanwater is net als elektra, gas & post een vanzelfsprekendheid en wordt over het algemeen zeer positief gewaardeerd. Kraanwater is niet 'top-of-mind' bij de consument
Groot vertrouwen in NL kraanwater → makkelijk toegankelijk
Geringe interesse staat in geen verhouding tot het belang tot het grote belang dat men aan kraanwater hecht
Zeer prositief beeld van NL kraanwater m.b.t. kwaliteit, levering & waarborging van deze kwliteitsaspecten.
Positieve imago is van jongs af aan gevoed door de continue kwaliteit van de watervoorziening
Consumentenwens: alles laten zoals het is
Informatievoorziening voor consumenten maakt slechts in geringe mate deel uit van de activiteiten opinieleiders
Nauwelijks betrokken en passieve houding opinieleiders t.o.v. informatievoorziening voor consumenten
Geringe interesse n kraanwater bij consumenten, nauwelijks tot geen sprake van 'publieke opinie', noch 'opinieleiders', omdat de politiek begrip heeft voor geringe interesse consument.

- Kennis kraanwater

Algemeen geen idee welke prijs men voor kraanwater betaalt, schattingen lopen zeer uiteen. Meestal oordeel: billijk/goedkoop. Men weet dat groot deel van de prijs belasting is, maar men weet niet hoe groot dat deel is en om wat voor soort belasting het gaat.

Zeer laag kennisniveau op alle relevante aspecten: oorsprong, productieproces, betrokken partijen, regelgeving en controle, prijs, samenstelling
Wanneer men het lage kennisniveau beseft verbaast hun eigen blinde vertrouwen in de watervoorziening
men gaat uit van een lage prijs, indien gevraagd is het antwoord vaak een forse onderschatting. Men vindt de prijs billijk, helemaal als men hoort dat waterbedrijven geen winstoogmerk hebben en wat voor inspanning het zuiveringsproces kost
Consumenten verwachten dat de prijs van het kraanwater in de toekomst zal stijgen, men verwacht geen effect op gebruik van kraanwater.
Kennisniveau m.b.t. 'bron', 'prijs', ' waterbedrijf' gering.
Naamsbekendheid waterbedrijf
Bekend met prijs per kubieke meter
Ja: 10 %
Nee: 89 %
Weet niet/geen mening: 2

- Kwaliteit kraanwater

Consumenten beoordeling: zeer goed (97 – 99 % tevreden over kraanwater NL)
Waar het op gebaseerd is komt niet duidelijk naar voren, maar berichten in de media, verhalen over verontreiniging, verhalen over Legionella & kwaliteit van de smaak/kleur/geur van het water kunnen ervoor zorgen dat het vertrouwen toeneemt dan wel afneemt
Kwaliteit water afgemeten aan veiligheid & smaak, vooral veiligheid.
Veiligheid wordt gedefinieerd in termen van 'niet ziek worden','het niet bevatten van gevaarlijke stoffen met effecten op langere termijn', en 'waterhardheid' (hierbij is het beeld dat zacht water beter is dan hard water)
Dienstverlening van de waterbedrijven wordt als goed beoordeeld op basis van: In het algemeen weinig klachten en verwachting dat afhandeling van klachten goed is.
Zeer groot vertrouwen in NL kraanwater vanwege de uitstekende watervoorziening.
Vertrouwen is voornamelijk gebaseerd op aannames en het feit dat er nooit wat mis gaat of is gegaan in het verleden.
Kwaliteit: uitblijven negatieve effecten op het lichaam, daarnaast ook zuiverheid (kleur?), neutrale smaak & goede service.
Consumenten hebben moeite de kwaliteit van het water los te zien van de kwaliteit van de levering.
Betrouwbaarheid levering & kwaliteit kraanwater gemiddeld 7,8. Eenderde vindt dat kwaliteit verbeterd moet worden, hiervan is de meerderheid vrouw.
Waardering waterbedrijven: gem. 7,5
Vertrouwen is gebaseerd op 'ervaring', 'goede kwaliteit','vertrouwen in controle op kraanwater' laatste is van minder belang.
Belangrijkste aspecten water: gezondheid & veiligheid, gevold door zuiverheid & smaak. Hierna komen de aspecten geur en helderheid/kleur. Hardheid sluit de rij. De constante levering van water en de prijs worden nauwelijks spontaan genoemd als belangrijke kenmerken.
Tevredenheid over diverse aspecten is groot. Over hardheid is men iets minder tevreden dan over andere kenmerken.

- Veiligheid water

Determinanten veiligheid:
- waterwinning & productie
- distributie
- aanleg & onderhoud leidingnet
- kwaliteitscontrole

Klachten worden gerelateerd aan kleur & smaak, referentie (onbewust) buitenland. Men weet van jongs af aan dat NL water goed is, dat er goede zuivering is.
Aannames consumenten: strenge eisen en normen, naleving daarvan en goede controle.
Aspecten 'betrouwbaarheid' en 'veiligheid' zijn in de beleving van de consument zeer nauw verweven.

- Samenstelling kraanwater

Ca. 95 % van de Nederlanders drinkt kraanwater en bijna iedereen is tevreden over de

kwaliteit.
1/3 drinkt ook flessenwater. Perceptie: betere smaak, gezonder, beter/zuiverder, betrouwbaarder, beter koelbaar, goed om mee te worden gezien. Meerderheid geeft echter aan dat er op de eerste aspecten nauwelijks verschillen zijn te vinden tussen kraan- en flessenwater

Klanttevredenheid over aan- en afsluiten van de waterlevering
Klanttevredenheid afhandelen aanmeldingen en opzeggingen van de waterlevering, 2004-2005
Aanvragers n = 2115
Opzeggers n = 1727

Indicatoren
- wijze van kenbaar maken aanvraag/opzegging
- behandeling aanvraag/opzegging
  op een vierpunt-schaal:
  - duidelijkheid
  - klantvriendelijkheid
  - vlot/traag
  - deskundigheid

Klanttevredenheid over het plaatsen van watermeters
Telefonische enquête onder 400 huishoudens (respons 74 %), 2005

Indicatoren
- algemeen oordeel over watermeters en waterbesparing
- informatievoorziening
  - informatiefolder
  - waterkrant
  - affiches
- feitelijke plaatsing watermeter
  - vriendelijkheid
  - nakomen afspraken
  - netheid van werken
  - beantwoorden van vragen
  - herkenbaarheid
  - rekening houden met specifieke wensen
- de service desk
  - bereikbaarheid
  - deskundigheid
  - vriendelijkheid van de contactpersoon
- facturering
  - duidelijkheid
  - volledigheid

Naamsbekendheid en imago onderzoek (kwantitatief) waterbedrijf
CATI (computer assisted telephone interviewing), 2004
506 mensen ondervraagd

Indicatoren
- spontane naamsbekendheid (naam waterbedrijf noemen)
- geholpen naamsbekendheid (in tweede instantie: 4 namen waterbedrijven voorgelegd)
- algemene tevredenheid
- tevredenheid over verschillende aspecten dienstverlening
  - informeren klanten over actuele zaken
  - kwaliteit drinkwater
  - geleverde kwaliteit service en diensten
  - zorgen dat de levering zo weinig mogelijk storingen vertoont
  - bij storing de levering met zo min mogelijk ongemak herstellen
  - snelle reactie op vraag of klacht
  - duidelijk & begrijpelijke info verstrekking door waterbedrijf
  - goede bereikbaarheid per tel / email

- makkelijk op internet te vinden
- waterbedrijf contact opgenomen met klant, tevredenheid daarover in termen van
  - duidelijkheid, begrijpelijkheid
  - snelheid
  - reden
  - deskundigheid medewerkers
- klant contact op genomen met waterbedrijf, tevredenheid in termen van
  - snelheid reactie op vraag of klacht
  - duidelijkheid, begrijpelijkheid informatie
  - Telefonische bereikbaarheid waterbedrijf
- voorkeur voor wijze van contact bij klanten die afgelopen jaar geen contact hadden
- begrippen van toepassing op waterbedrijf
  - saai
  - innovatief/vernieuwend
  - actief

NB
CATI is 'uitermate geschikt als het gaat om onderzoek naar actuele onderwerpen waarbij reactie of opinie moet worden geregistreerd' (top of mind). Drinkwater is echter niet top of mind. Het is niet bekend waarop de operationalisatie gebaseerd is (Bijv.: misschien vindt de klant het helemaal nietszeggend als hij aangeeft dat het een 'actief' bedrijf is)

Imago-onderzoek
Onderzoek naar imago waterbedrijf onder particuliere klanten, 2003
telefonisch n = 500
internet n = 500

Indicatoren
- de organisatie:
  - naamsbekendheid
  - belang en tevredenheid diverse taken
  - klachten
  - steun aan goede doelen
  - eigendom waterbedrijven
  - duingebied
- het product:
  - kennis van de waterbron
  - tevredenheid over kraanwater
  - vertrouwen in kraanwater
- prijs en nota
  - kennis prijsniveau
  - oordeel prijsniveau
  - duidelijkheid nota
  - oordeel frequentie nota
  - bereidheid te betalen voor frequentere nota
  - kennis en oordeel belastingheffing
- communicatie
  - informatiebehoefte
  - voorkeursmanier speciale handelingen
  - handelingen via de website
  - aflezen watermeter op afstand

voor 7 taken van waterbedrijven is aan de respondenten gevraagd hoe ***belangrijk*** zij die vinden:

- zorg voor **natuurbeheer** in waterwingebieden
- zorgen voor **zacht water**
- het op **klantvriendelijke** wijze bedienen van een klant
- het leveren van **betrouwbaar drinkwater** dat aan de kwaliteitseisen voldoet
- zorgen dat de **prijs** van het drinkwater aan zo laag mogelijk blijft
- zorgen dat de **levering** zo weinig mogelijk storingen vertoont
- helpen bij de waterwinning van veilig water in de **Derde Wereld**

NB
Pas op voor sociaal wenselijke antwoorden. Men zegt natuurbeheer en veilig water in de 3e wereld belangrijker te vinden dan de prijs, maar is dat zo? (Uit prioriteitendiagram blijkt dat natuurbeheer op de laatste plaats van belangrijkheid komt)

Imago-onderzoek waterbedrijven
Telefonische interviews (N = 576), 1999

Indicatoren

- naamsbekendheid
- belang en taken en dienstverlening en tevredenheid over de belangrijkste hiervan
  - betrouwbaar water
  - weinig storingen
  - natuurbeheer
  - klantvriendelijkheid
  - veilig water 3e wereld
  - laag mogelijke prijs
- Zacht water
- Klantencontact
  tevredenheid over
  - vriendelijkheid
  - luisteren
  - deskundigheid
  - wachttijd
  - doorverbinden
  - duidelijkheid antwoord
- klachten
- informatiebehoefte
  - algemene info (advies geven & op de hoogte gehouden worden)
  - hoe water gewonnen wordt
  - kwaliteit van het water
  - over het bedrijf zelf
  - prijzen
  - natuurbeheer / vervuiling
  - 3e wereld activiteiten
  - hardheid van water
  - zuiveringsproces van water
  - vooruitgang van zacht water
  - anders
- eigendom
- kenmerken drinkwater
  belangrijkste kenmerk:
  - zuiverheid
  - smaak
  - hardheid
  - helderheid
  - geur
  - kleur
- imago drinkwater
  vertrouwen, redenen waarom vertrouwen afneemt
  Redenen waarom het vertrouwen is afgenomen zijn vanwege:
  - verhalen over bacteriën die daarin zitten
  - verontreiniging
  - publiciteit / media
- waterprijzen
- waternota
- belasting

NB
Probleem gedefinieerd door experts. Direct gevraagd naar bereidheid meer te betalen, dus sociaal wenselijke antwoorden. Daarbij alleen de mensen gevraagd die al aangaven die taken

belangrijk te vinden, maar de rest zou ook gevraagd moeten worden.

Bekendheid en imago-onderzoek
Onderzoek naar bekendheid en imago van een waterbedrijf en kraanwater, 2004
Telefonisch; n=500

Indicatoren

- naamsbekendheid
- oordeel over het waterbedrijf
- imago
    - zo weinig mogelijk storingen
    - prijs
    - natuurbeheer
- prijzen drinkwater
- waternota
- contact
    - klanten informeren
    - klantvriendelijk
- klachten
- oordeel over het product water
  betrouwbaar drinkwater
    - kleur
    - helderheid
    - geur
    - smaak
    - zuiverheid
    - hardheid
- kraanwater en flessenwater
- mediacampagne

NB
Probleem grotendeels door experts gedefinieerd, maar dankzij op en vragen kunnen respondenten wel aanvullingen en accenten weergeven.

Klantperceptie-onderzoek naar klantwensen voor nieuw informatie systeem (service)
De functionele eisen en wensen van een klant voor een nieuw informatie systeem d.m.v. "Klantpanel"bestaande uit 15 medewerkers waterbedrijf en 1 medewerkster Waterschap, 2004

NB
Het onderzoek geeft de mening van 16 medewerkers weer, die zich 'in hebben geleefd in de klant'; dus niet alleen de probleemstelling is gedefinieerd door experts, maar ook de antwoorden.

Kwalitatief onderzoek naar klantwensen onder huishoudelijke consumenten
Groepsdiscussies (4 groepen, 6 deelnemers per groep) met particuliere klanten, reacties op uitgewerkte bedieningsprofielen en eventuele achterliggende factoren die hierbij een rol spelen, 2006

Te weinig onderscheidend vermogen tussen de groepen: geen duidelijke lijn in de type mensen, achterliggende houding en behoeften, en wensen op het gebied van interactie met waterbedrijf.

- klant vindt t allemaal prima, low-involvement
- prijs = relatief goedkoop
- behoeften lijken generiek (geen onderscheid tussen groepen)
- bellen: kritische factoren: 1) antwoord, 2) snelheid → goed geholpen = in 1 x vraag beantwoord, begripvolle & deskundige medewerkers., lang wachten veroorzaakt negatieve stemming
- brief/mail: binnen 2 dagen ontvangstbevestiging (met indicatie responsetijd)
- factuur bij voorbaat / per definitie niet te begrijpen. Men wil: verbruik, kosten en evt. bijbetalen weten
- meterstand doorgeven 1 x per jaar = geen probleem (gewend en men ziet de logica), gebruikt bij controle afrekening. Meter aflezen is wel n probleem,

deze is vaak slecht bereikbaar, in sommige gevallen op zijn kop of buiten geplaatst.
- intelligente watermeter: grootste voordeel = lekdetectie, zelf opnemen en doorgeven wordt niet als probleem ervaren, temperatuur bijhouden en nachttarief worden niet als nuttig ervaren
- betaling op basis van werkelijk verbruik betekent omslag en daar zit met niet op te wachten, maandelijks hetzelfde bedrag wordt als prettig ervaren
- doorgeven bij verhuizing: bevestiging is prettig
- werkzaamheden is begrip voor, planning verloopt soepel, helaas wel te ruim tijdslot. Kaartje door de bus (meer dan 2 dagen van tevoren) bij afsluiting water
- bij storing wil men wel graag geïnformeerd worden als het lang duurt (desnoods met geluidswagen). Even geen water is geen probleem.
- iedereen zeer te spreken over de waterkwaliteit
- bij klachten wel hele aardige mensen aan de tel, maar totaal geen interne communicatie: telkens weer opnieuw het hele verhaal
- waterbedrijf creëert zelf wantrouwen klant als (administratieve) dienstverlening fouten bevat
- DE KLANT WIL WATER UIT DE KRAAN EN VERDER GEEN GEDOE
- feedback zowel telefonisch als per e-mail of brief

NB
Discussies geleid a.h.v. groslijst vermeende kenmerken van beoogde segmenten, opgesteld door de experts. Dat deel is onjuist gebleken (mogelijk als gevolg van middengroep in selectie deelnemers). Uitkomst gedefinieerd door klant.

Klantvoorkeuren voor waterhardheid
Onderzoek naar de klantvoorkeuren met betrekking tot hardheid va het water, 2005
Telefonische enquête, n = 400

Indicatoren
- oordeel hardheid kraanwater
- kalkafzetting
- ontkalking warmwater apparatuur
- gebruik antikalkmiddelen
- kosten verwijderen kalkafzetting en vroegtijdig vervangen apparaten door kalk
- gebruik ontkalkers
- opinie over hard en zacht water
  - verantwoordelijkheid waterbedrijf om voor juiste hardheid te zorgen
  - betalingsbereidheid

NB
Onbekend is welke vragen de respondenten voorgelegd hebben gekregen. Probleem gedefinieerd door de gebruiker. Bias bij directe vraag naar 'bent u bereid meer te betalen, zo ja, hoeveel?'

Watergebruik
Screenings-, dagboekonderzoek en vragenlijst om doeleinden waterverbruik te achterhalen, 2004
246 waarnemingen (huishoudens die aan het onderzoek meededen)

Indicatoren
- bad
  - watergebruik via bad
  - penetratie bad (hoeveel huishoudens over een bad beschikken)
  - gebruiksfrequentie bad
- douche
  - watergebruik per douche per persoon
  - penetratie
  - gemiddeld aantal douches per dag (persoonsniveau)
  - gemiddelde doucheduur p.p.
  - aanwezigheid besparende douchekoppen (p.huish.)
  - aantal l water per min. door douchekop

- penetratie warmwater toestel (p.huish.)

➢ wastafel
- watergebruik per wastafel licht gedaald (p.p.)
- penetratie (aanname: elk huish. Min, 1 wastafel)
- gebruik (frequentie wassen a.d. wastafel)

➢ toilet
- watergebruik toilet p.p.p.d.
- penetratie (100 %)
- penetratie stortbak
- gebruik (gem. aantal toiletspoelingen)

➢ wasmachine
- watergebruik wasmachine in l.p.p.p.d.
- penetratie
- gebruik (aantal wasbeurtenp.p.p.d.)
- watergebruik p. wasbeurt wasmachine

➢ handwas
- watergebruik handwas
- frequentie handwas p.p.p.d.

➢ vaatmachine en handafwas
- watergebruik vaatwasmachine p.p.p.d.
- penetratie p.huish.
- gebruiksfrequentie p.p.p.d.
- watergebruik per vaatwas
- watergebruik handafwas p.p.p.d.
- gebruiksfrequentie handafwas p.p.

➢ overig gebruik: keukenkraan
- watergebruik (naar doel p.p.p.l.p.d.)

➢ klachten

NB
Uit (veranderingen in) gebruik kunnen klantwensen ten dele afgeleid worden

Opiniepeiling leidingwater (kwalitatief)
Kennis, meningen en ervaringen van opinieleiders (5 open interviews) t.a.v. drinkwater en t.a.v. communicatie met consumenten, mate van betrokkenheid bij drinkwater en hun doelstellingen en speerpunten, 2004

Lage betrokkenheid & passieve houding politiek representatief voor geringe interesse klant.
Weinig mening, het gaat goed dus low priority.
Informatievoorziening volgens opinieleiders geen prioriteit, mede omdat het zo goed gaat.
Het wordt pas relevant geacht áls er iets gebeurt.

NB
Wat zeggen de meningen van 5 opinieleiders over wat 'de klant' wil van de waterbedrijven?
Impliciet wordt door de beleidsmakers aangenomen dat communicatie het vertrouwen vergroot. Er is verschil tussen vertrouwen en veiligheidsgevoel. Bijv. bij terrorisme geldt: meer info kan juist gevoel van onveiligheid vergroten.

Glossary

Acceptable risk	See 'tolerance'
Acceptance	Willingness to receive, willingness or ability to tolerate. Also an affirmative answer to a proposal
Attitude	An evaluation of a social object (broadly defined)
Attribute	Characteristic, aspect of a product or service. Consumers can prefer / accept certain product or service attributes compared to others, or prefer / accept levels of attributes
Belief	Consumers' cognitive representations of an object. We use the term primarily to refer to consumers' representations of water and the supply system. There is no requirement that beliefs coincide with reality
Concern	Expressed anxiety or unease over an object broadly defined (e.g. tap water, a proposal).
Confidence	An expectation that something will occur as anticipated. For example an expectation that safe water will be provided to your tap. Confidence is usually based on previous confirmations of expectations.
Consumer	Private/civil society consumers of water
Customer	Purchaser of drinking water – usually a house holder but also the purchaser of bottled water
Drinking water system	"from source to consumer" covering water resources and its catchments, water extraction, drinking-water production, water distribution, consumer water usage
End user	The water company/industry
Expectation	Two definitions: one is the act of expecting or looking forward. The other, more technical one, being the perceived or estimated probability of an event

Harm	Injury or damage to health, property or the environment (IEC)
Hazard	Any biological, chemical, physical or radiological agent that has potential to cause harm (WHO) or source of potential harm or a situation with a potential of harm (IEC).
Hazardous agent	Agent (i.e. biological, chemical, physical or radiological agent) that has the potential to cause harm (WHO).
Hazard identification	Process of recognizing that a hazard exists and defining its characteristics (IEC).
Hazardous event	An incident or situation that can lead to the presence of a hazard (WHO) or event which can cause harm (IEC).
Knowledge	Consumers' factually accurate beliefs about something, usually the supply and/or regulatory system in the present case
Perception	As a belief above but with the emphasis on the notion that this belief may not accord with some other representation of the same ill-defined object e.g. 'Lay' vs. 'Expert' representations of risk. Also the attitudes and intuitive judgments about risk. (EC)
Preference	An option that has greater/greatest anticipated value among a number of options
Public awareness	Consumers' beliefs about the water sector and system
Risk	The (perceived) likelihood of identified hazards causing harm in exposed population(s) in a specified timeframe, including the magnitude of that harm and/or the consequences or combination of the frequency, or probability, of occurrence and the consequence of a specified hazardous event (IEC).
Risk analysis	Systematic use of available information to identify hazards and to estimate the risk to individuals or populations, property or the environment (IEC).

Risk assessment	Overall process of risk analysis and risk evaluation (IEC).
Risk aversion	Unwillingness to accept risk
Risk communication	Exchange or sharing of information and science based opinions considering risk among decision makers, scientists and other actual or potential stakeholders (based on EC and ISO)
Risk perception	See 'perception'
Satisfaction	The fulfilment and gratification of the need for a stated product or service attribute (for example, taste, color, billing, complaints handling, etc.)
Service	(Additional) business from company to customer, often accompanying product delivery. For example, asset maintenance, customer care, etc.
Stakeholder	Actor within the water system, e.g. anyone that have influence on the water supply system (for example policy-makers, professional employees, NGOs, Academics, Experts)
Trust	A firm belief in the reliability or truth or strength etc. of a person or thing. Willingness to make oneself vulnerable based on a perceived similarity of the values and intentions of another (person/group/organization etc.). Also used in the literature to mean confidence in the sense of having an expectation that something will happen.
Willingness to pay (WTP)	Preparedness to spend certain amount of money for a (combination of) product(s) or service(s). WTP also refers to stated preference techniques for economic valuation of goods and services, based on economic welfare theory. WTP studies can be used to elicit consumers' preferences, inferred from the relative monetary amounts that consumers are prepared to spend on gaining or avoiding certain (combinations of) service or product features.