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Customers' trust and the perception of public drinking water quality in Amman.

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Summary

This research addresses the challenges that the Jordanian Water Authority and the public water utility in facing in regaining customers' trust, and improving the perceived quality of public drinking water. In Amman, even though the drinking water quality fully complies with required standards, the public perceive the quality as poor and regard the water as unsafe. Sector officials relate this negative perception to the decline of customers' trust in public water institutions after a contamination incident in one of Amman's major water treatment plant twenty years ago.

Based on earlier studies on trust in customer relationships, customers trust in the service provider was unbundled to three elements. Those elements are a) process-based trust which relates to customers' confidence service provider's competency in service delivery, b) goodwill-based trust which relates to customers' belief in services provider's show of good faith and integrity in dealing with its customers and c) system-based trust which relates to the confidence in efficiency of regulatory system governing the service delivery in enforcing service standards. In this research the extent of each element's influence on perceive quality was investigated and explained. Understanding the extent of each elements influence can provide a helpful insight to the policy makers to develop strategies in targeting the most influential element thus effectively improve those perceptions. Therefore, the research questions are: What is the level of customers' trust in Miyahuna measured across the three elements? What is the current perceived quality of tap water in Amman? And, to what extent does each element of trust influence the perceived quality?

This research is quantitative, it employed survey as a research strategy and questionnaires as the main data collection instrument. The survey covered 216 households within Miyahuna service area which serves 617,000 households in Amman.

The level of process-based, goodwill-based and system based trust were measured and the results showed that customers had generally a fair level of trust across the three elements. The perceived quality of water which was assessed based on colour, odour, taste, biological, chemical and radiological safety. The results showed that water colour, odour and taste were perceived as being good. The views about water safety however, were different. The results confirmed the concerns about water biological and chemical safety and the presence of radioactive matter in their water.

Data analysis showed that all three elements of trust had significant influence on the perceived quality. However, the magnitude of the influence varied between the elements. System-based trust is the element of trust that had the biggest influence on perceived quality. Process-based trust had the second biggest influence and good-will based trust had the least influence on perceived quality. Which indicates that people regard having an efficient regulatory system that is monitoring Miyahuna's performance and ensuring the quality of water thus minimizing health risks is more important than just relying on competency and goodwill of Miyahuna to deliver good quality water. Based on the findings of this research, the authorities have to focus on improving the public trust in the regulatory system governing water quality monitoring since it is the most influential element of trust as demonstrated by the results of this research.

Keywords

Perceived quality, trust, water quality, perceived risk, customer, service provider.

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Abbreviations

IHS	Institute for Housing and Urban Development
WAJ	Water Authority of Jordan
KFW	Kreditanstalt für Wiederaufbau "Reconstruction Credit Institute"
JSMO	Jordanian Standards and Metrology Organization
MOH	Ministry of Health
WHO	World Health Organization
JMP	Joint Monitoring Program
MDG	Millennium Development Goals
O&M	Operation and Maintenance
ACWUA	Arab Countries Water Utilities Association
SPSS	Statistical Package for Social Sciences
JFDA	Jordanian Food and Drug Administration
CPA	Customer Protection Association

Table of Contents

List of Tables

List of Figures

List of Pictures

Chapter 1: Introduction

Customers' trust and the perception of public drinking water quality in Amman: to what extent does the trust in service provider (Miyahuna) influence the perceived quality of drinking water in Amman?

1.1 Background

Jordanian Water Authority (WAJ) and its water utilities have in the last two decades been facing many difficulties in regaining customers' trust, and improving their perception of public water quality, which deteriorated after the famous incident of Zai water treatment plant contamination in 1989, where half of the population of Amman received green foul smelling water from their taps. The contamination was caused by excess concentration of algae in the raw water that was beyond the treatment plant's capacity to clean. The authorities took immediate emergency measures to control the contamination. Water supply was stopped and the residents of Amman were advised to refrain from using tap water, and use substitute sources until the pollution was cleared. Although the contamination was cleared after one week and normal supply was resumed, people never felt safe to drink tap water again.

This incident was a turning point in the water sector, and in the public perception of tap water quality, not only in Amman but in the whole of Jordan. Ever since this incident people feel tap water is unsafe. According to latest surveys, more than 70% of the population do not drink tap water and prefer to use substitute sources like bottled or filtered water (KFW, 2008, Eco Consult, 2010)

The water authority has since the incident been putting a lot of effort to improve water quality by upgrading water treatment plants, setting higher standards for drinking water quality and establishing a strict monitoring system. Although those efforts are put in place to avoid similar incidents in the future, customers still perceive tap water quality as being poor and unsafe.

In a survey conducted by KFW in 2008 in three cities to assess public water and sanitation service in Jordanian households, focus groups were held to solicit resident's view on the quality of supplied water. The general theme between the respondents was that water quality is very poor and that water is polluted. Additionally, almost all respondents stated that they don't trust the quality of water supplied, opting to buying bottled water or filtering it at home (KFW, 2008). Another survey conducted in the middle governorates of Jordan in 2010 by the Millennium Challenge Corporation Water Project confirmed the same (Eco Consult, 2010).

A similar incident occurred in Walkerton community in Ontario Canada in 2000, when water was found contaminated by bacteria and a number of people fell ill. Public concern about water safety and the fear of recurring incidents led to abandoning tap water. After many years and continuous efforts spent by the Canadian municipal water utilities' on improving treatment and tightening water regulations, the public perception about municipal water quality and its safety remains low (Dupont, 2005). In Lilla Edet which is a municipality that had a high reputation of water quality in Sweden, a contamination incident in 2008 caused a break of illness. Although the authorities acted swiftly and controlled the contamination efficiently, a customer survey conducted after two years of the incident showed similar attitudes towards water quality as in the cases of Walkerton and Amman (Bratanova, Morrison, et al., 2013). Similar cases are countless, even though the circumstances are different in each case, a general theme that appears in all customers' surveys is a loss of trust and a negative perception of water quality.

A number of studies found a close relationship between water quality perception and trust in water related institutions. For example, Doria and Pidgeon (2009) consider the public trust in

water companies or water related institutions as an important factor influencing public perception and evaluation of drinking water quality. A study conducted on 1,000 customers in Water Authority in Western Australia (WAWA) to investigate the effect of the attitudinal and dispositional factors on people's perception of water quality, found a positive correlation between customers' trust in WAWA and customers' evaluation of delivered water quality (Syme and Williams, 1993).

1.2 Problem statement

In the city of Amman, drinking water is delivered to customers through a piped supply network serving 99.7% of the 2,600,000 population. Water services are provided by Jordan Water Company (Miyahuna), which is a state-owned utility, fully owned by the Water Authority of Jordan. Miyahuna is responsible for treatment of raw water, operation and management of the distribution network, collection, discharge and treatment of wastewater. Amman's water supply is 70% from ground aquifers and 30% from dams. Bulk water collected from the resources is conveyed to distribution reservoirs that feed 400 distribution districts by gravity. Due to the limited resources of water, an intermittent supply regime is adopted where each district receives water once a week. Water supplied to household is stored in roof tanks usually of 4 to 6 m^3 size and is used all through the week.

In terms of water treatment and quality, the bulk of Amman water is treated in Zai Water Treatment Plant. Treatment methods include physical, biological and chemical treatment. The quality of treated water is tested by Miyahuna at Zai central laboratory to ensure its compliance with the national standards. Jordanian National Standards for Drinking Water Quality are set by WAJ in collaboration with the Jordanian Institute of Standardization and Metrology (JISM). The WAJ and the Ministry of Health (MOH) are responsible for monitoring Miyahuna's adherence to the standards and apply a quality monitoring system adopted from World Health Organization's (WHO) Guidelines for Drinking Water Quality.

The Water Authority as well as Miyahuna carry out regular sampling and testing on daily basis at different levels; production system, primary, secondary and tertiary distribution network. Around 250 samples are collected and put through 1,000 biological and chemical tests. Test results show full compliance to the standards for the whole kingdom (WAJ, 2014). The quality and safety of drinking water in Jordan is also confirmed by WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation (JMP), the formal instrument to measure progress towards achieving MDG 7 target C. In 2005 JMP implemented an assessment for drinking water quality. The assessment teams visited more than 1,600 drinking water supply sites to collect water samples and statistical data. The results confirmed the validity of routine national monitoring data. Chemical and bacterial tests showed high level of compliance with WHO guideline in the distribution network and residual chlorine concentration found at the household level was enough to ensure the safety of water at the time of consumption (Properzi, 2010). On the other hand, customer views on water quality are different. A household survey undertaken in 2007 by University of Reading (Potter, Darmame, et al., 2010) to study water-related perceptions in the city of Amman revealed that water quality is a major issue for Amman households. 82% of the surveyed households evaluated the water quality as bad, and more than 70% indicated that they don't use public water for drinking. General mistrust regarding the quality of public water supply was voiced by the respondents. Customer surveys conducted later by Miyahuna (2011, 2012) showed similar results.

Improving public perception of Jordan water quality to be more reflective of the actual quality is one of the water sector's top priorities. Water sector officials relate the negative perception

of water quality to the loss of customers' trust in public water institutions after the Zai contamination incident. However, no studies to date have been undertaken to understand how trust influences customer views on water quality or how they form their perception about water quality.

The relationship between trust and perception has been widely researched in many streams of literature such as social behaviour, customer service relations and public administration. In the field of public services this relationship is mostly explained by the micro-performance theory; which relates variation of trust in public service institutions to variation of those institutions' performance expressed as the quality of delivered services or the perceived quality of delivered services (Bouckaert and Van de Walle, 2003).

In consumer relations, Johnson and Grayson (2000) suggest that trust is generated from three different sources. Each source representing a distinct element of trust namely; System-based trust, Process-based trust, and Goodwill-based trust. System-based trust is generated from the rules and regulation governing the institutions involved in service delivery. Process-based trust is generated from the process of interactions between the customer and the service provider. And goodwill-based trust is generated from social bond that the customer develops with the service provider after repeated interactions. As such, in this research, customer's trust in the service provider is envisaged as a combination of those three elements.

Quality perception as explained by Steenkamp (1990), is an evaluative judgment. According to Steenkamp the product presents the consumer with a number of attributes, based on which the consumer forms informational and inferential evaluation, the aggregate evaluation of those attributes result in the perceived quality. Referring to this, in this research, perceived quality is defined as the customers' aggregate evaluation of the water quality attributes (i.e. odour, colour, taste, and safety)

A better understanding of the factors that affect public perception of water quality can contribute to improvements in water management. In fact, it is suggested that perception can be more important than reality when it concerns the quality of drinking water (de França Doria, 2010). From the given background of Amman, trust in water institutions is thought to be a factor affecting public perception of drinking water quality, therefore a better understanding of the extent to which its influencing customers' water quality perception and the extent of the influence of each of trust elements can be helpful in optimizing the efforts in targeting the most influential element thus effectively improve those perceptions towards more realistic evaluation of water quality.

1.3 Research objective

This research objective is providing knowledge that will be beneficial in developing targeted solutions to improve public perception of drinking water quality in Amman by explaining the extent of the influence of different elements of customers' public trust in Miyahuna on their perception of water quality.

1.4 Research questions

To what extent does customers' trust in the water service provider (Miyahuna) influence the perceived quality of drinking water in Amman?

1. What is the level of customers' trust in Miyahuna?

2. What is the current perceived quality of tap water in Amman?
3. To what extent does process-based, goodwill-based and system-based trust influence the perceived quality?

1.5 Significance of the research

The practical significance of study is threefold. (a) This is the first study that assesses the level of public trust in water institutions. Sector officials have for past 20 years been concerned about declining public trust but to date no studies have been furnished to assess it. This study can form a baseline for future trust assessments. (b) Existing studies and/or assessments of the public attitude and perception of drinking water quality in both Amman and Jordan are lacking sound theoretical grounding. Thus this research will fill in this gap by drawing on the wealth of theoretical knowledge in the of quality perception. And finally, (c) The findings on this research will be helpful for the Jordanian water sector in developing targeted solution for an effective management of customers' perception which is considered to be one of customers' satisfaction improvement strategies. Customers satisfaction has been recognized as one of the main pillars in the sustainable management of urban public services. Studies have found that customers' satisfaction or dissatisfaction has implication of on the utilities business performance and customers' willingness to pay. As such, in the context of Amman improving customer satisfaction with water quality could help gain their support for the much needed tariff increase, as the unpretentious and slow paced increase of water tariffs is not sufficient to meet the growing service delivery costs is posing a risk on the sustainable management of water infrastructure as the current water tariffs barely cover half of O&M cost.

As for the academic significance, this research contributes to the existing knowledge the factor influencing public perception or evaluation of drinking water quality. Studies has so far been devoted to examining the relationship between trust, risk perception, and acceptance. This study will add to that body of literature by studying the link between trust and perceived quality directly. In addition to that, it contributes to the existing body of literature on trust by adopting Johnson and Grayson model that has not yet been deployed in empirical research.

1.6 Scope and limitations

This research focused on the influence of trust on quality perception by relating the variations in the perceived quality of drinking water to the variation of customers trust in the service provider. Due to the lack of previous measurements of the level of trust in water related institutions in Jordan this research was limited to observing the cross sectional variations amongst the surveyed population whereas it would have been best to observe them in a temporal survey that would better capture the different operational conditions of service delivery during the period of time investigated. Nevertheless, this level of trust measured in the scope of this research could serve as baseline a starting point for future studies.

Chapter 2: Literature Review / Theory

2.1 Introduction

This chapter provides a literature review based on which this research is constructed. Section (2.2) explains the micro-performance theory which explains the relationship between the core concepts in this research namely; trust and perceived quality. Section (2.3) includes a discussion of the concept of trust, its definition, its elements and dimensions in customer-service provider relationship and how it begins and evolves during this relationship. Section (2.4) discusses the definitions of perceived quality, an explanation of the quality perception process and the factors that affect consumer's perception of a certain product quality. Section (2.5) combines the concept of perceived quality in the domain of drinking water and finally section (2.6) gives an overview of the study area (Amman) to relate the discussed concepts to the empirical settings. And finally section (2.7) which illustrates the conceptual framework that was deployed for the rest of the research.

The literature reviewed for this research was selected from different disciplines. In regards to the concepts of quality perception or perceived quality, the literature reviewed included consumer attitudes, consumer relations, and customer service relations mainly from the business and marketing literature. While this choice of literature might seem odd given that drinking water is a public service, the choice of marketing literature seemed suitable since the new public management approach approaches citizens as customers of public services, it favours the business-like government including the treatment of users as customers. Another point that was taken into consideration in the choice about perceived quality was whether to consider drinking water as a "product or good" or a "service"; tap water is a tangible consumable product but at the same time it cannot be completely treated as a typical commercial product that the customer can go to the store and assess before purchase or pay attention to brands and other aspects of commercial goods, in addition tap water is a product that one receives continuously there is not clear distinction of the time of purchase and time of consumption it was decided to include some literature about service quality as well . The monopolistic nature of this product or service provision is also taken into consideration when dealing with the literature.

Similarly, for the concept of trust the literature about consumer-buyer relations was complemented with literature on citizen-government relations to respect the public nature of the relationship while taking into consideration not to include the political aspects of the government. Thus the literature selected concentrates on the administrative side (service delivery institutions). Since both perception and trust are mental constructs, some literature on social behaviour was reviewed as well.

2.2 Trust and perceived quality in micro-performance theory

The relationship between trust and perception has been widely researched in many streams of literature such as social behaviour, customer service relations and public administration. In the field of public services this relationship is mostly explained by the micro-performance theory.

Micro performance theory is an extension of the performance theory; it was primarily used in explaining citizens declining trust in the government. In the application of this theory Bouckaert (2002) distinguished two parts of the government, the political part and the administrative part. In regards to the political part of the government the theory relates variation of citizens' trust in the government to variations in the quality of democracy. In regards to the administrative part the theory relates variation of public trust in public service institutions to

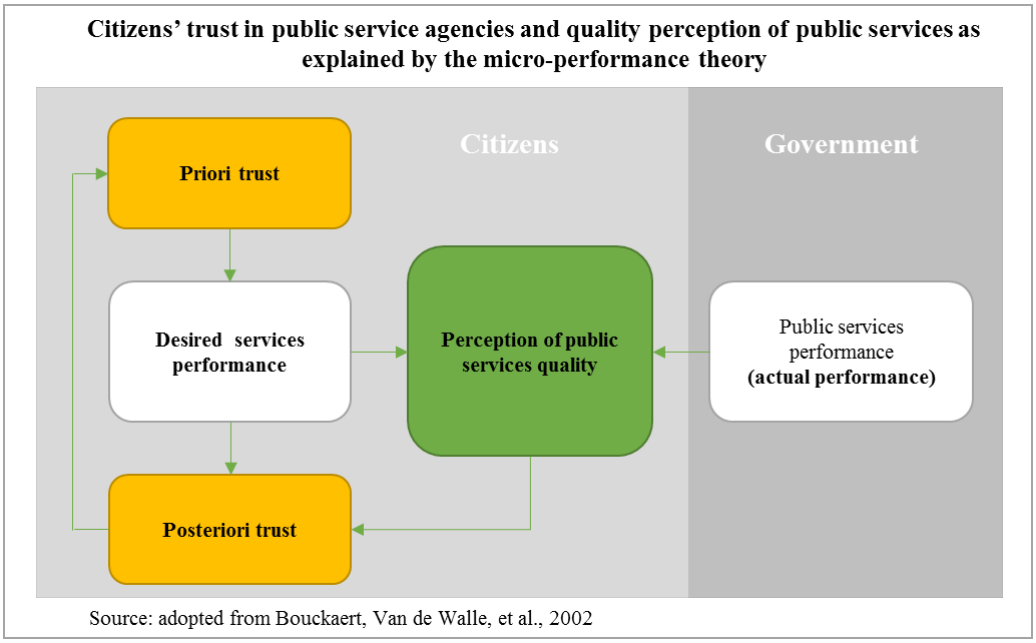
variation of those institutions' performance expressed as the quality of delivered services or perceived quality of delivered services.

Researchers seem to be divided in explaining this theory. At one end, some argue that good performance of public service institutions develops trust. At the other end, some believe that trust in public institutions leads to a more favourable evaluation (perception) of public institutions' performance (Bouckaert and Van de Walle, 2003). Doubts on the direction of causality were earlier expressed by Huseby (2000) who concluded that it is uncertain whether the public negative evaluation of the government's economic performance is because of their lack of trust or if people lose trust in government if they view the performance as poor. On the other hand, some empirical studies as the study conducted by the Canadian Centre for Management Development in 2003 on the public evaluation of urban services found that general attitudes towards government affect perceptions of service quality (Bouckaert and Van de Walle, 2003).

The question of, which comes first, trust or perception? could find an answer in Bouckaert's model (Bouckaert, 2002). The model illustrates a cyclic relationship between trust and perception. At each stage of service usage, the users will be evaluating the quality of service (perceived quality) by comparing the delivered service (performance) to his/her desires and needs of that service, if those needs are matched then this will result in good perceived quality, successive positive evaluations build confidence and trust (posteriori trust). Posteriori trust re-adjusts the level of affinity (priori trust) by either positive or negative reinforcement. Positive reinforcement leads to more flexibility in level of desired service thus more positive evaluation. The relationship between trust and quality perception as explained by the micro-performance theory is illustrated in figure (2.1).

Keeping this in mind, nevertheless for the purpose of this research trust is approached as an independent variable, and perception as a dependent variable. This choice seemed sensible as some water researchers found that, in cases of previous contamination incidents it's most likely that trust affects perception (Bratanova, Morrison, et al., 2013) which is similar to the case of Amman.

Figure 2. 1: The relationship between trust and perceived quality as explained by the micro-performance theory



Source: adopted from Bouckaert, Van de Walle, et al., 2002

2.3 Customer's trust in the service provider

2.3.1 What is trust?

"We know much better what trust does than what trust is" (Castaldo, Premazzi, et al., 2010)

Despite the universally accepted importance of trust, there is little agreement on a comprehensive meaning of trust. According to Castaldo et al. (2010) the difficulty in defining trust lies in its multifaceted and layered nature.

Trust has been widely studied in many streams of literature i.e. psychology, sociology, social exchange, business relationships and public administration. Each stream studied the phenomena of trust from a different point of view, that it not surprising to find so many different definitions of trust. Some of those definitions are listed below:

Trust is ….

- *"One's faith in the trustworthiness of another"* (Chang, Dillon, et al., 2006).
- *"Is reliance on others' competence and willingness to look after, rather than harm, things one cares about which are entrusted to their care"* (Baier, 1986)
- *"Is accepted vulnerability to another's possible but not expected ill will (or lack of good will) toward one"* (Baier, 1986)
- *One's expectation the another party will behave in a certain way and by not behaving that way the trusting party will experience negative outcomes (Johnson and Grayson, 2000).*
- *"A generalized expectancy held by an individual or group that the word, promise, verbal, or written statement of another individual or group can be relied on"* (Rotter, 1980)
- *"An expectation about the behaviour of others in transactions, focusing on the contextual factors that enhance or inhibit the development and maintenance of trust"* (Lewicki & Bunker, 1995).

Castaldo et al. (2010) reviewed 20 years of marketing, strategic management, psychology, and sociology literature, in an attempt to compose a shared and common view of the meaning of trust. In their review they found 96 different definitions; some scholars viewed trust a state of mind or an expectation, while other scholars viewed it as a behaviour, a decision, a process, a moral obligation or a mechanism to coordinate interactions between different parties. Castaldo et al. concluded their review with the following general framework in which different definitions of trust can be subsumed.

Trust is …..

(a) An expectation or a belief, a reliance, confidence, that a

(b) trustee distinguished by characteristics of honesty, benevolence, competencies,

(c) will perform future actions aimed at producing

(d) positive results for the trustor,

(e) in situations of possible risk and vulnerability.

2.3.2 Elements and dimensions of customers trust in the service provider.

Lewicki, Tomlinson, et al. (2006) explain two main approaches or psychological traditions that divided the world of research on trust. Those two approaches are namely (a) the cognitive approach and (b) the affective approach.

In the cognitive approach, trust has been viewed as a rational choice, a calculative decision about the partner's trustworthiness that results from the partner's expertise and reliability. This approach has also been called knowledge-based trust (Shapiro, Sheppard, et al., 1992) emphasizing that the calculative decision is based on the knowledge accumulated about partner's expertise and reliability. While in the affective approach, trust relies on the affinity resulted from the emotional ties between the both parties, and the trustor's believe in the good faith and integrity of the trustees to act in the interest on the trustor (Das and Teng, 2004a).

Although the mention of affective or emotional trust might sound irrelevant in business relations, some scholars explain that trust can be viewed as a behavioural intention that reflects a reliance on the trustee, it involves vulnerability on the part of the trustor towards some uncertainties of the trustee's actions the might impose risks on the trustor (Moorman, Zaltman, et al., 1992), since customer relationship with firms and service providers involves risks of personal aspects especially in routine service delivery it is important not to ignore the emotional trust part even though the cognitive trust will most likely dominate (Johnson and Grayson, 2000).

Johnson and Grayson (2000) developed a model that integrates the cognitive and affective dimension and identified three elements that constitutes customer trust in the service provider. They conceptualized that each of those elements represent a distinct source of trust. Those elements are discussed below.

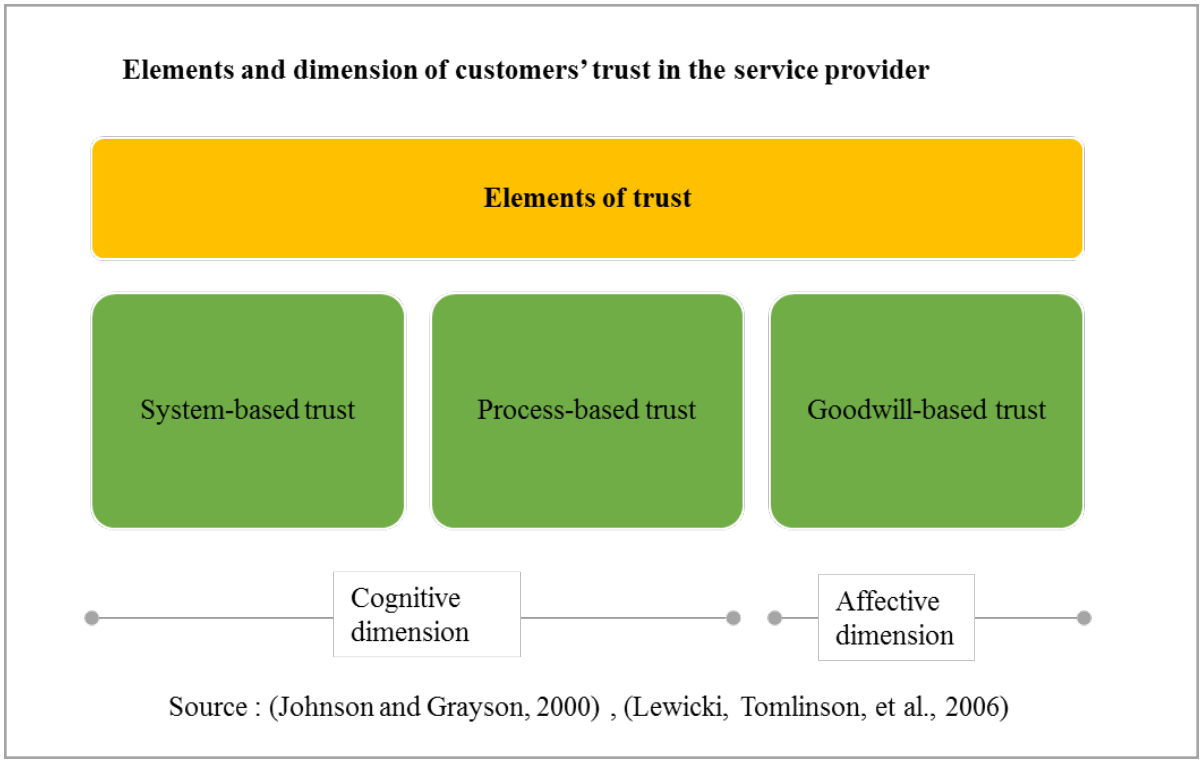
Elements of trust

1. **System-based trust:** defined as customer's confidence in the reliability of the regulatory institutions in enforcing the rules governing the service delivery. Researchers explain that sometimes our expectation of others behaving in a certain way is based on the rules dictated by the institutions. Trust stems from the ability to structure a system of clear rules, rewards and punishment so those involved act in a specified manner thus be inherently be trustworthy (Bhattacharya, Devinney, et al., 1998). In customer-service provider relationship these rules could be the service standards or consumer protection systems (Johnson and Grayson, 2000).
2. **Process-based trust:** defined as customer's confidence in the service provider's competency to deliver the promised service. It develops from an accumulated knowledge about trustee that allows the trustor to make predictions, with some level of confidence about the likelihood that trustor will live up to his/her obligations (Johnson and Grayson, 2005). In other words, in the context of service relationships confidence is developed through repeated interactions between the customer and the service provider. The level of confidence grows with positive interactions (confirmation of expectations) and declines with negative interactions (disconfirmation of expectations). During those interactions a social bond is created and emotions come into play (Johnson and Grayson, 2000), which forms the third element of trust that is discussed below
3. **Goodwill-based trust:** which is defined as the customer belief of the service provider's integrity (Johnson and Grayson, 2000). The customers' expectation are rather beliefs in the service party's integrity and moral obligation to take correct actions and not put the customer's interest at risk (Lewicki, Tomlinson, et al., 2006).

Johnson and Grayson also note that, those elements of trust are not easily distinguishable, nor they exist in isolation of each other. Those elements rather coexist and enforce each other.

Based on the above understanding, customer's trust is defined in this research as "a combination of system-based, process-based and goodwill-based trust the creates confidence and belief in the service provider's competency, reliability and integrity to deliver the promised service". The above mentioned elements and dimension of trust are illustrated in figure (2.2).

Figure 2. 2: Elements and dimension of customers' trust in the service provider



Source : (Johnson and Grayson, 2000) , (Lewicki, Tomlinson, et al., 2006)

2.3.3 How does trust begin?

Now that we know the elements that constitutes trust and how it grows or declines in service relationships, one aspect remains unknown that is, where does the level of trust begin? Lewicki, Tomlinson, et al. (2006) explain that in early studies, trust was assumed to start from zero when involved parties have no past experiences or history. In this assumption the trustor has to rely on his/her analysis of the situation and own predisposition to make the decision to interact with the other party or not. However, studies conducted later rejected this assumption, and argued that trustor in case of no prior experience with the trustee relies on the system safeguards (rules and regulations) as well as the information they have about the trustee in other words the trustee's reputation to establish an initial level of trust (Lewicki, Tomlinson, et al., 2006).

2.4 Perceived quality

2.4.1 Definitions of Product quality

Product quality has been studied from many perspectives. In order to understand the concept of product quality it is important to have an insight into the perspective it is being approached from. Steenkamp (1989) lists the four main perspectives identified in the literature: (1) The metaphysical approach of philosophy, (2) the production management approach, (3) the economic approach, and (4) behavioural or perceived quality approach.

Metaphysical approach focuses on the philosophical opinion that quality is universally recognizable but on the hand has no one meaning. "Quality is neither mind or matter, but a

third entity independent of the two, even though quality cannot be defined, you know what it is" (Garvin, 1984).

Production management approach sees quality as an objectively measurable concept described in the technical specification (Steenkamp, 1989), it defines Quality as "conformance to requirements" or as "the degree to which a product conforms to specifications" (Garvin, 1984).

The economic approach, focuses on quality from the market point of view, it defines quality "degree of excellence at an acceptable price and the control of variability at an acceptable cost" (Garvin, 1984).

Perceived quality approach, focuses on the subjective dimension of quality, the evaluation of quality is based on the point of view of the customer or end user, it is defined as "the degree to which a product can satisfy the wants of specific customer", "the extent to which a specimen possess the service characteristics you desire" (Garvin, 1984), or as Juran (1988) puts it, quality is fitness for use.

2.4.2 Definitions of perceived quality

There are many different definitions of perceived quality found in literature, in addition to the two mentioned above, some of best known definition are listed below:

Box (1983) defined perceived quality as "the degree to which a product fulfils its functions, given the needs of the consumer."

Monroe and Krishnan (1985) see that perceived quality definition is similar to Box's but add to it the comparative concept thus they define it as the perceived ability of a product to provide satisfaction relative to the consumer in comparison with available alternatives.

Another definition dates back to 1976 was proposed by Maynes who defined perceived quality as the extent to which the specimen provides the characteristics that the consumer desires (Maynes, 1976).

Steenkamp (1990 p.317) defines it as "Perceived product quality is an idiosyncratic value judgment with respect to the fitness for consumption which is based upon the conscious and/or unconscious processing of quality cues in relation to relevant quality attributes within the context of significant personal and situational variables".

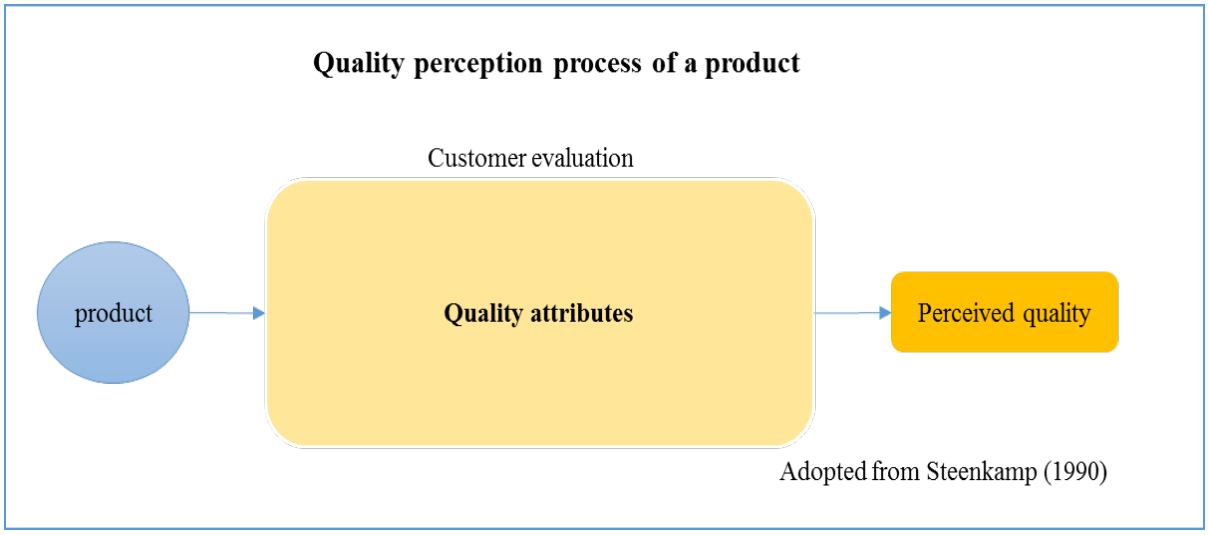
Definitions might vary but two common things are "customer evaluation" of the product's "fitness for use".

2.4.3 Quality perception process

In order to understand the customer's perception of the quality, it is important to explain the process of perception.

Steenkamp (1990) explains the process the consumer goes through to arrive at the perception of the quality of a certain product. According to Steenkamp, quality perception is an evaluative judgment the consumer makes based on certain characteristics of or related to the product, Steenkamp calls these characteristics "quality cues and attributes" whereas other scholars, for example Shapiro call them collectively as "quality attributes". To avoid confusion, it will be called hereinafter in this research as "quality attributes". Most known quality attributes for food products for example are taste, colour, and wholesomeness. Quality attributes are not only part of the product but could also be things related to the products the most known are price and brand or manufacturer. Figure (2.3) illustrates quality perception process.

Figure 2. 3: Product quality perception process



2.4.4 Factors affecting consumer's perception of product quality

Many variables affect the consumer's personal judgment in the process of perception. Steenkamp (1990) identified the main following factors:

1. Consumers involvement in the product: individuals who are more involved in the product for example, consumer who are involved in purchasing of the product show more motivation to process information about it, thus their judgment is based more on product-related information than external interferences.
2. Prior knowledge of the product: consumers with more prior knowledge about the product are able to process more product-related data, thus evaluate a higher number of more quality determinants during the perception process. Thus they are more likely to form less extreme judgments about possible variations in some of the quality dimensions.
3. Consumer's quality consciousness: relates to the degree of elaboration given by the consumer in the process of quality perception and it mostly influences the price-quality trade-offs judgment.
4. Consumer's level of education: this affects the ability of the consumer to process information about the product, therefore less educated consumers are more likely to form less abstract judgment, be less reliant on the product quality determinants and more reliant on external sources to form their judgment.
5. Perceived product quality risk: the perceived quality risk of the product affects the overall judgment of the product quality.

While it is important to understand the factors that affect the quality perception, evaluating the above mentioned factors is outside the scope of this research.

2.5 Water quality

2.5.1 Definition of safe drinking water

"Safe drinking-water, as defined by the WHO Guidelines does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages" (World Health Organization, 2011p.1).

2.5.2 Water quality attributes

WHO guidelines (2011) for drinking water quality provides guidelines for the recommended limits of naturally occurring substances in water that may cause adverse health effects after prolonged exposure or increased concentrations. It also provides a range of supporting information, including microbial aspects, chemical aspects, radiological aspects and acceptability aspects.

Microbial aspects: In general terms, the greatest microbial risks are associated with consumption of water that is contaminated with faeces from humans or animals, health effects range from intestinal to infectious diseases.

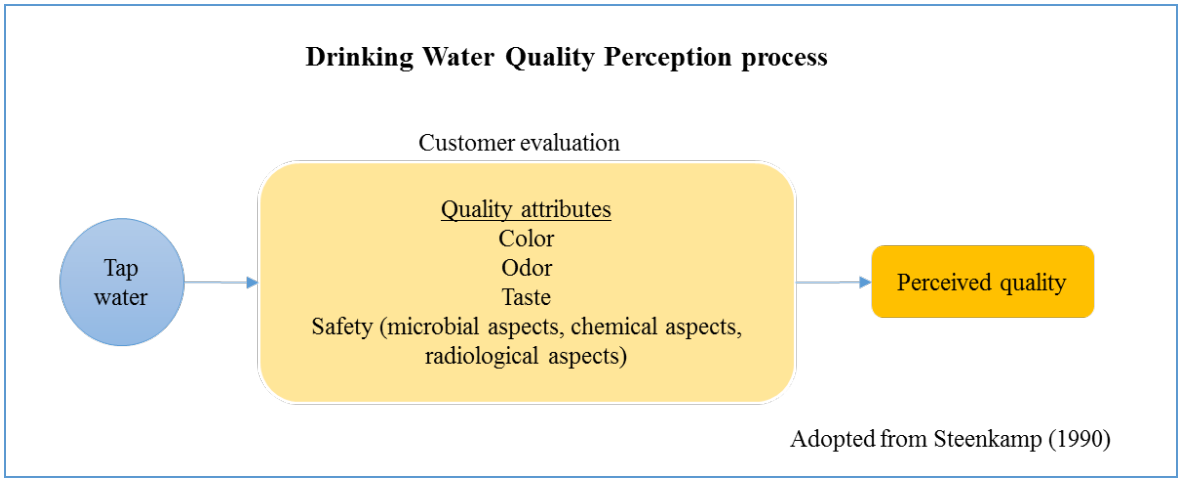
Chemical aspects: Most chemicals arising in drinking water are of health concern only after prolonged periods of exposure. There are many chemicals that may occur in drinking-water; however, only a few are of immediate health concern in any given circumstance.

Radiological aspects: contribution of drinking-water to total exposure to radionuclides is very small under normal circumstances, nevertheless health risks associated with the presence of naturally occurring radionuclides in drinking-water should also be taken into consideration.

Acceptability aspects: Water should be free of taste and odour that would be objectionable to the majority of consumers. Microbial, chemical and physical constituents of water may affect the appearance, odour or taste of the water, although these constituents may have no direct health effects, water that is highly turbid, is highly coloured or has an objectionable taste or odour may be regarded by consumers as unsafe and rejected.

Researches show that the sensory aspects taste, odour and colour and clarity are the most used attributes to evaluate water quality, while the microbial, chemical, or radiological aspects cannot be sensed it's likely collectively refer to attribute of safety (de França Doria, 2010). Based on this customers' perception of drinking water quality is illustrated in figure (2.4)

Figure 2. 4: Drinking water quality perception process



2.6 Background of study area (Amman)

Amman is the capital city of Jordan and is situated in the northern central part of the country. It is the most populous city and the country's economic, political and cultural centre. The city has an estimated population of 2.6 million and a land area of 1,680 square kilometres (Department of Statistics, 28-09-2016).

Figure 2. 5: Google map of Jordan showing the study area (Amman).

2.6.1 Water supply in Amman

The city of Amman has high level of providing public water supply and sewerage collection services. 99.7% of the households are connected to water supply network, and 93% to sewer network (Miyahuna, 2015). Due to the limited resources of water, an intermittent supply regime is adopted where each district receives water for one day a week. At the household level, publicly supplied water is stored in roof tanks usually 4-6 m3 size to be used all through the week.

Figure 2. 6: Roof tanks used in Amman households to store public supply water

Source: Author

2.6.2 Drinking water quality

The drinking water standards in Jordan is based on the guidelines of the World Health Organization (Properzi, 2010). Jordan's standards were raised in 2001, after a major drinking water pollution outbreak occurred in Amman in the summer of 1998 due to a malfunction of the Zai water treatment plant which Amman's major drinking water treatment plant. The standard now includes specific measures to be undertaken in case of the occurrence of pollution in drinking water samples (ACWUA, 2011). A 2010 assessment of drinking water quality that covered more than 1,600 drinking water supply sites confirmed the compliance of water quality with WHO guideline (Properzi, 2010).

2.6.3 Miyahuna

Public water supply and sewerage collection services in Amman are provided by the Jordan Water Company most commonly known as Miyahuna[1]. Historically the provision of water and wastewater services was the responsibility of the Water Authority of Jordan (WAJ). A law passed in 2004 allowed WAJ to assign its operational functions to a third party thus Miyahuna was established in 2007 as a corporatized water utility fully owned by WAJ. The responsibilities assigned to Miyahuna by WAJ include the operation and maintenance of water supply network, wastewater discharge network, water and wastewater treatment plants within its service area. WAJ retains the management of water resources and provides the bulk water (USAID, 2013).

2.6.4 Water treatment and quality monitoring at Miyahuna

Miyahua operates 5 water treatment plants, the bulk of water is treated at Zai water treatment plant which has a capacity 250,000 m^3 /day of and Zara Maen water treatment plant with a

[1] Translated from Arabic to English "Miyahuna" means "Our Water".

capacity of 110,000 m^3/day. Treatment includes physical, biological and chemical treatment. Miyahuna adopts Water Safety Plan framework as required by the World Health Organization (WHO) Guidelines for Drinking water which requires a risk assessment encompassing all steps in water supply. Water quality testing routine at Miyahuna includes daily sampling from resources, water treatment plants, main distribution reservoirs and the supply network. The samples are tested for biological, chemical and radiological safety at Miyahuna laboratories which holds both national accreditation (JAS) and international accreditation (UKAS) according to ISO 17025 /2005. According to Miyahuna annual report 2015 the number of water samples collected was 88,000 and the number of tests applied was 416,000 during 2015 and the compliance rate was 99.67% which exceeds WHO guidelines of 95% (Miyahuna, 2015).

2.6.5 Water quality monitoring (regulating) MOH and WAJ

Drinking water quality monitoring in Jordan is the responsibility of the Water Authority of Jordan WAJ and the Ministry of Health MOH. WAJ is authorized to set water quality standards different uses of water including drinking water according to WAJ Law, Art. 6(f).

Ministry of Health is charged with the control of potable water, regardless of its source (private or public) in order to ensure its fitness for public consumption from a health standpoint and can take the necessary procedures to prevent the use of any undrinkable water. This includes taking of samples and testing those samples (Public Health Law No. 54 of 2002). This also includes control of potable water networks (to ensure that they are not exposed to pollution); and specifying the methods to be used for treatment, transmission, distribution and storage of potable water (Art. 41).

WAJ has advanced water quality testing facilities and it Drinking Water Quality Surveillance Routine for the whole of Jordan. Ever since WAJ delegated water service provision tasks in Amman to Miyahuna it took the role of regulatory and monitoring body ensuring the compliance to water quality standards. WAJ monitoring authority over Miyahuna are stipulated in the service agreement signed between both parties and defines the required level of service. According to the service agreement Miyahuna is obliged to report its laboratory test results to WAJ on quarterly basis and in case of local contamination incidents to report the contamination case to WAJ instantly for follow up. The assignment agreement lacks the enforcement tools i.e. WAJ cannot apply sanctions on Miyahuna in case of non-compliance. In fact, legally WAJ is the only body that will be held accountable in case of non-compliance.

The role of MOH is limited to local contamination cases, it gets involved along with the Water Authority of Jordan in tests the samples at MOH laboratories and giving permission to Miyahuna to resume supply or not. Sometimes local contaminations cases occur at the house connection level which occur due to break in water pipelines. In this case the procedure taken by Miyahuna and the authorities is as follows: upon receiving a complaint of contamination, Miyahuna sends a team for local inspections, water samples are taken from the location and tested initially on site. If any sign of contamination is shown then the affected area gets disconnected from water supply, customers' storage tanks are emptied and chlorinated. When the break is fixed the water pipelines are flushed and disinfected then samples of water are tested in WAJ central labs and MOH central labs if the test results are fine the supply resumes. Such contamination cases do not exceed 25 cases in year (WAJ, 2014).

2.6.6 Public perception of drinking water quality

A household survey undertaken in 2007 by University of Reading (Potter, Darmame, et al., 2010) to study water-related issues in the city of Amman. Results revealed that water quality

is a major issue for Amman households. 82% of the surveyed households think the water quality is bad and more than, 70% indicated that they don't use public water for drinking. General mistrust regarding the quality of public water supply was voiced by the respondents. Customer surveys conducted later by Miyahuna (2011, 2012) showed similar results.

In addition to concerns about bacteriological quality of water, a new concern about water quality has been exchanged in social circles about the radiological safety of water in the last 3 years. In 2013 Disi water conveyance project was commissioned transporting water from a fossil ground water aquifer in the southern part of Joran to Amman which has now become a major supply source of water to the city. At the beginning of the project some reports surfaced about high radio-active concentration in the fossil aquifer (The New York Times, 2012). The authorities confirmed that the concentrations are within allowable standards and there are no safety concerns. Nevertheless, the public concern is still there and WAJ is constantly trying to alleviate it. No formal studies have been conducted to assess customers' perception on this matter. Therefore, in this research, the researcher took the opportunity to assess public perception on this matter.

Other than Zai water treatment plant contamination incident in 1998 there is no record of any major contamination case that caused disease outbreak. Some few case of disease outbreak were recorded in other cities of Jordan, the latest was on 2007 caused by a faecal contamination in the water sources supplying the city causing 600 cases of illness (Royal Scientific Society, 2007).

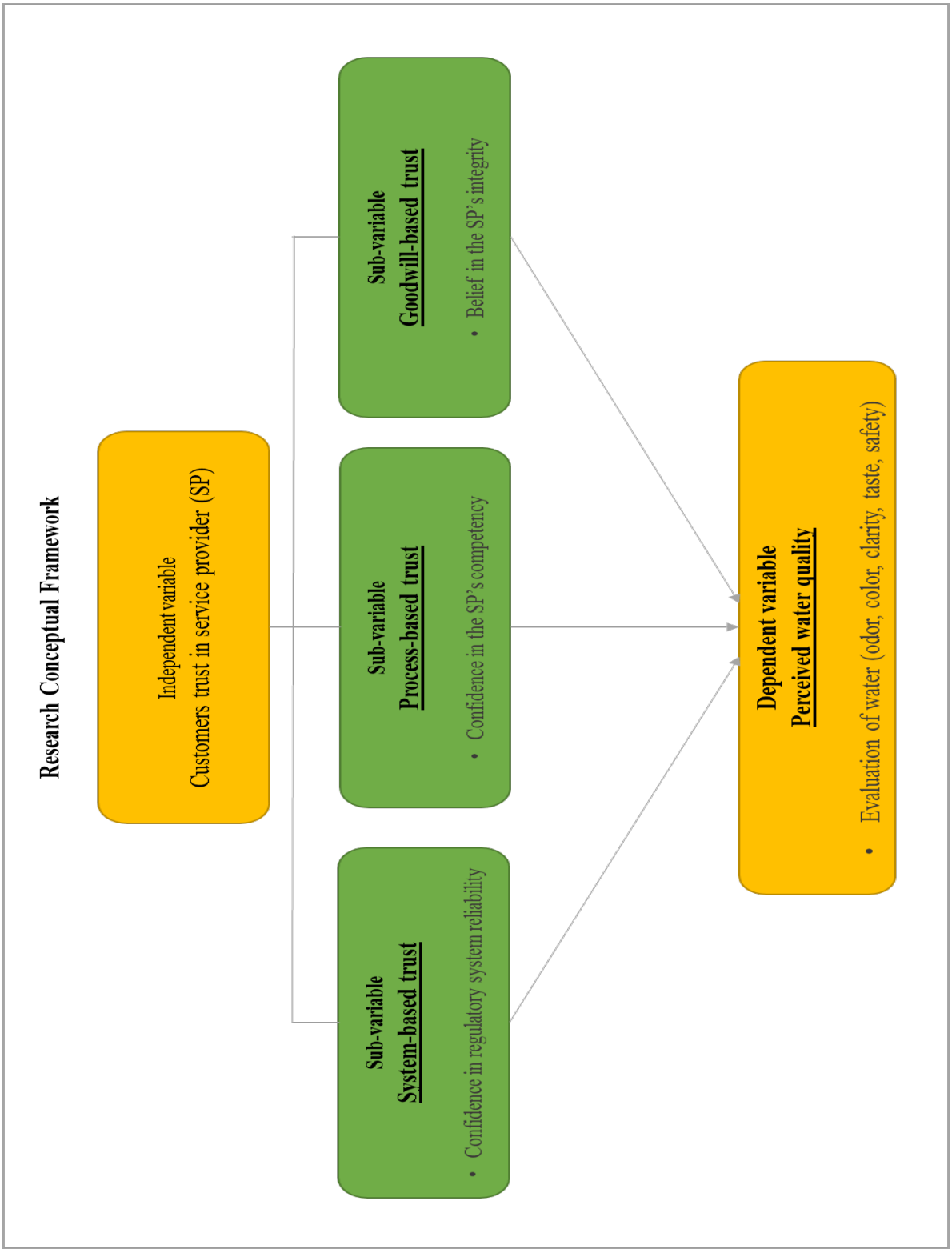
2.6.7 Drinking water source at Amman households

As mentioned above the majority of people do not use tap water for drinking. Instead they use either bottled water or water vendors at bought from local treatment shops, a trend which appeared after the Zai contamination incident. Some people install filters to treat water at their home. According to study on 2007 (Potter, Darmame, et al., 2010) 70% of the households use other water other publicly supplied water for drinking.

2.7 The conceptual framework

The literature review provided and understanding the relationship between trust and perception as explained in the micro-performance theory. The literature review on the concept of trust provided an understanding on different elements of customers trust in the service. The literature on quality perception provided an understanding of the basis on which the quality perception is formed. Based on this the following conceptual framework has been constructed.

Figure 2. 7: Research conceptual framework



Chapter 3: Research Design and Methods

3.1 introduction

This chapter starts with the presentation of the research questions, followed by a description of the theory and definition of the variables derived from it. The variables are then operationalized by identifying measurable indicators (section 3.3). After the operationalization the research strategy is described in section (3.4), detailing how the research will be carried out. Section (3.5) explains the instrument developed to collect data on the identified indicators. Sections (3.6 and 3.7) give an overview about the area and unit of stud for this research. Section (3.8) details the sampling procedure used to select a representative sample of the study population to collect data from. Section (3.9) provides a detailed documentation of the field work and data collection period. Section (3.10) highlights the challenges pertaining to the validity and reliability of the collected data. Finally, section (3.11) provides an overview of the methods and tests applied to analyse the collected data.

3.2 research questions

To what extent does customers' trust in the water service provider (Miyahuna) influence the perceived quality of drinking water in Amman?

1. What is the level of customers' trust in Miyahuna?
2. What is the current perceived quality of tap water in Amman?
3. To what extent does process-based, goodwill-based and system-based trust influence the perceived quality?

3.3 Operationalization

Operationalization is an important step in any research; it is the transitioning the research from theoretical to empirical phase. Operationalization means translating the theoretical concepts (variables) into measurable entities known as indicators (Thiel, 2014).

The operationalization was done by defining the theory that forms the backbone of this research, variables of central interest were then derived and given a workable definition captured from the literature review in the previous chapter, lastly measurable indicators were defined.

This subsequent sections outline the operationalization process described above and concludes with the operationalization table.

3.3.1 Definition of theory, variables and Indicators

Micro-performance theory*:** relates variation of public ***trust in service providing institutions to variation of those institutions' performance expressed as the quality of delivered services or the ***perceived quality*** of delivered services (Bouckaert, 2002).

Two variables were derived from this theory; trust in the service provider as an independent variable and perceived quality as dependent variable. The choice of independent and dependent was explained in section 2.2. Based on previous literature review those variables are defined as shown below.

3.3.1.1 Customer trust in the service provider (independent variable)

Customer trust in the service provider is composed of three main elements: system-based, process-based and goodwill-based trust that create confidence and belief in the service provider's competency, reliability and integrity to deliver the promised service. Each of those elements is considered as a sub-variable in this research

Process-based trust (sub-variable 1): defined as customer's confidence in the service provider's competency and dependability to deliver the promised service (Johnson and Grayson, 2000).

Goodwill-based trust (sub-variable 2): defined as the customer belief in the service provider's fairness, integrity and honesty towards its customers (Lewicki, Tomlinson, et al., 2006).

System-based trust (sub-variable 3): defined as customer's confidence in the efficiency of the regulatory institutions in enforcing the rules governing the service (Johnson and Grayson, 2000). In the context of Amman, the regulatory institutions are the Water Authority WAJ, and the Ministry of Health. The rules could be understood as the National Drinking Water Standards.

3.3.1.2 Perceived quality of water (dependent variable)

Perceived quality is customer's evaluation of the quality attributes, quality attributes are on certain characteristics of the product (Steenkamp, 1990). In case of water, those characteristics are colour, odour, taste, and safety (World Health Organization, 2011). According to World Health Organization WHO "Safe drinking-water, is defined as water that does not represent any significant risk to health over a lifetime of consumption. Water safety is evaluated in three aspects: microbial, chemical and radiological (World Health Organization, 2011).

3.3.2 Operationalization of variables

Table (3.1) summarizes the micro performance theory and the two variables derived from it; trust in the service provider as independent variable and perceived quality as dependent variable. Based on the literature review of trust in service relationship, trust was broken down to three elements (sub-variables) namely; process-based, goodwill-based and system-based trust. Indictors were defined by reflecting the working definition of each variable on the empirical context of this research.

Process-based trust: customers' confidence -expressed as their opinions- of Miyahuna's competency, dependability and reliability in service delivery measured on 5-point Likert scale.

Goodwill-based trust: customers' belief -expressed as their opinions- of Miyahuna's fairness, integrity and honesty measured on a 5-point Likert scale.

System-based trust: customers' confidence -expressed as their opinions- of the efficiency of the monitoring agencies (WAJ and MOH) in enforcing Miyahuna's adherence to drinking water quality standards measured on a Likert scale (1-5).

Table 3. 1 Summary of operationalization

Theory	Variable	Sub-variables	Indicators

Micro-performance Theory.	Customers Trust in the service provider	Process-based trust.	Customers' opinion in Miyahuna's competency, dependability and reliability in service delivery measured on a 5-point Likert scale.
		Good-will based trust	Customers' opinion in Miyahuna's fairness, integrity and honesty measured on a 5-point Likert scale.
		System based trust.	Customers' opinion of the efficiency of the monitoring agencies in enforcing drinking water quality standards measured on a 5-point Likert scale.
	Perceived quality of water.		Average of customers' evaluation of water colour measured on a 5-point Likert scale.
			Average of customers' evaluation of water odour measured on a 5-point Likert scale.
			Average of customers' evaluation of water taste measured on a 5-point Likert scale.
			Average of customers' evaluation of water safety (biological, chemical and radiological) measured on a 5-point Likert scale.

3.4 Research strategy

The next step after identifying clear measurable indicators is deciding how the data for those indicators will be collected in other words what research strategy will be used. According to Verschuren (2010) three main aspects define which is the most appropriate strategy for a certain research. The first aspect is the objective of the research, whether it is opting for breadth or depth, the other aspect is the primary collected from the field or secondary data collected from a desk research, the final aspect is the researcher's preference for quantitative or qualitative analysis and finally whether the research will be carried out in the field or desk.

The objective of this research is explain the extent of the influence of customers trust in the water service provider on their perception of tap water quality. It aims at producing broad knowledge that represents the general opinions of Amman water customers. Thus data has to be collected form large number of study units which is 617,000 customers in this case (Miyahuna, 2015). On account of the large number of study units and the abundance of data that will be produced quantitative analysis was carried out.

Taking all these factors into consideration, survey was chosen as research strategy. This choice was deemed most suitable for two main reasons: survey strategy has proven to be highly efficient in large scale studies and it is the best known research forms used by organizations for customer studies and opinion polls (Thiel, 2014) which is similar to this research subject.

3.5 Data collection instrument

The primary data collection instrument for surveys is a questionnaire (Thiel, 2014). Questionnaires can be used to collect both quantitative and qualitative data. Qualitative data is transformed into quantitative data by means of coding the answers into numerical values (Verschuren, Doorewaard, et al., 2010). In this research the data was collected through self-administered questionnaires disseminated on door-to-door basis.

The questionnaire content was developed based on an in depth review of applied methods in attitude measurement (Alreck and Settle, 2004), trust measurement in organizations (Institute of Public Relations, 2013) and similar empirical research on quality perception (Steenkamp, 1989).

Questionnaire items were mainly formed of close ended attitudinal questions on 5-point Likert scale format. One binary question (yes, no) was followed by conditional branching where some questions were skipped. Only one open ended question was used. Nominal scale questions were used for respondents' demographic data.

The questionnaire can be divided to 6 section. The first section of the questionnaire contains an introductory paragraph explaining the purpose of the questionnaire and the time it will take to complete it. The second section included 7 items to measure process-based trust (4 items) and goodwill-based trust (3 items) on a 5-point Likert scale. The third section was added based on the pilot survey findings which showed that some people don't have knowledge about the regulatory system of water quality, thus are not able to score system-based trust. Therefore, the questionnaire was updated to include questions to assess the respondent's knowledge about the topic as a pre-requisite to move to the following section and give their opinion about it. The questions in this section were structured in 3 steps based on the unaided recall method (Alreck and Settle, 2004) which basically aims at assessing the respondents' knowledge by a series of questions that gradually extracts the information from the respondent in an undirected manner.

The fourth section of the questionnaire was related to measuring system-based trust and included it 4 items on a Likert 5-point scale. The fifth section was related to the measurement of perceived quality of water it consisted 6 items on a Likert 5-point scale. The sixth and final section was dedicated to demographic and personal data of the respondent.

It should be noted that each section was started with an explanatory paragraph of the purpose of the questions and instruction to follow. The questionnaires were first written in English and translated into Arabic, both copies are in Annex (1).

3.6 Area of study

The area of study for this research was the service area of Miyahuna which is the city of Amman. The land area of Amman is about 1,680 square kilometres and it has an estimated population of 2.6 million (Department of Statistics, 28-09-2016).

3.7 Unit of study

The unit of study in this research is the water service customer in Amman. Thus the study population was defined as those consumers who are receiving water supplied by Miyhuna. Each registered customer in Miyahuna records represents a household connected to the public

water service (water network). According to the figures obtained from Miyahuna, the number of customers (households connected to water service) is 617,000 (Miyahuna, 2015).

Since perceptions and trust are primarily developed through the individual's interaction with the product and its provider as explained in sections (2.2.4 and 2.3.3), the selected respondent was the member of the household that is usually responsible for the administrative running of the household including dealing with service providing companies like telephone company, electricity company and water company.

3.8 Sample size and selection

The size of the sample needed to provide data that are representative of Amman population within a calculable margin of error was calculated using a confidence level approach (Sapsford, 2007) the sample size needed for a confidence interval of 95% with a margin of error 5% was estimated to be 384.
To improve the representativeness of the sample, stratified sampling on the basis of household income level was applied. According to Neuman (1997) stratified sampling procedure produces a sample that is more representative of the population than a simple random sampling. In stratified sampling the population is first divided to subpopulations (strata) then simple random sampling is applied for the selection from within the group.
In respect to household income level Amman is generally divided to two parts, East Amman which low to medium income population mostly resides and West Amman where higher income population resides. Based on the customer numbers from Miyahuna database the ratio between East Amman to West Amman customers is 55%:45%. Based on this ratio the sample was divided to 211 households from east Amman and 173 households from west Amman. The random selection of households from each area was done as follows:

1. The map of the examined areas was divided in sectors (a sector mainly represents a neighbourhood), each sector was assigned a number.
2. Manual number draw was used to select four neighbourhoods, namely Sweifieh and Shimesani from West Amman. Arjan and Sweileh from East Amman.
3. The number of required houses in respect to the strata was divided equally between the two selected neighbourhoods.
4. Five streets from each neighbourhood were selected by haphazard or convenience sampling. Convenience sampling was applied here because the streets in Amman are not regular and not well mapped.
5. Houses within each street were selected by systematic sampling. Since the count of houses in each street was unknown it was not possible to calculate a sampling interval therefore the researcher decided to use a sampling interval of 3, that is select every third house in the street.

Maps and pictures of the selected neighbourhoods are attached in the Annex (2).

3.9 Field work and data collection

Field work took place during the period of (12/06 to 10/07) which is about 26 working days. The questionnaires were disseminated by visiting the selected households. the researcher assisted by three volunteers took charge of door to door distribution of questionnaires. The duty of each member of the team was to deliver the questionnaire to the head of the visited household then leave the respondent to answer the questionnaire then come back in 20 mins to collect it. During the period from (June 12th – June 26th) the team visited 90 houses from Arjan, 100 houses from Sweileh, 80 houses from Sweifieh and 90 houses from Shimesani. However, the team was able to collect only 82 questionnaires from the total of 360 houses visited. The

response rate from East Amman was 26% and 19% from west Amman. The low response rate was mainly due to two reasons:

1. Time of the visit: most of the visited houses residents were not home at the time of the visit; people where either not at home during that time of day or in a long vacation. In other cases, the head of the household was not available during the time of the visit.
2. People's rejection: In many cases the team was not granted access to the house, or people were not willing to cooperate in filling the questionnaire. although the letter provided by IHS was presented but some people did not feel comfortable to open their doors for strangers

The response rate could have been improved by visiting the houses after working hours or on weekends, but that was not possible due to logistical reasons. Rejection rate could have been reduced if the team had a supporting letter from a known party like Miyahuna or WAJ. Pairing the team (male, female) could have been also helpful to make people more comfortable especially in the case where women were alone in house, however that was not possible due to resource limitations as double the team would have been needed.

Based on the work progress in the first two weeks, it was obvious that the questionnaire distribution method has to be reconsidered in order to achieve the target sample. Given the limited resources and time, the researcher decided that the most efficient way is to distribute the questionnaire to people in public meeting places i.e. shopping centres, mosques and gathering places of public events and so on. Thus during the period of (June 27th to July 10th) the team visited 6 shopping venues from East Amman, 6 from West Amman, 1 mosque from each area and 1 public event. The respondents were selected by convenience sampling. The questionnaires were handed to the respondents to answer it independently and returned on the spot. Attention was taken to vary the visit times during the day in order to reach working and non-working people. Since the team was approaching people in public places and not in their houses, there were three major concerns:

a. People in those public places might not be residents of Amman.
b. If they are residents of Amman, they might not necessarily be residents of the same area.
c. The selected person is not running a household.

Therefore, before handing the questionnaire to the respondent he/she would be asked if he/she lives in Amman, whether he/she is the head of the household. If the person answered yes to both then he/she would be qualified to answer the questionnaire and indicate whether they live in East or West Amman.

At the end of field work the team was able to collect (278) questionnaires. (62) questionnaires were disqualified because they were less than 80% completed or represent a repetitive trend of answers in Likert scale for more than 10 consecutive questions. The final number of the accepted questionnaires was (216). 44% of them were from East Amman and 56% from West Amman which does not represent the strata.

3.10 Validity and reliability

3.10.1 Validity

i. <u>Internal validity</u>

Internal validity relates to how well the study measures what was intended (Thiel-van, 2007). This starts with the operationalization of the concepts (variables) into measurable indicators that fully capture the concept. The next step after identifying the indicators is designing the right measurement instrument. According to Theil (2014) the indicators to be measured should be captured as correctly and precisely as possible, not only that but the distinction between the different values that the item can assume should be clear.

Coming from this understanding, a great deal of attention was put into developing the survey questionnaire. Its content was developed based on an in depth review of applied methods in attitude measurement (Alreck and Settle, 2004), trust measurement in organizations (Institute of Public Relations, 2013) and similar empirical research on quality perception (Steenkamp, 1989). Furthermore, the first version (see Annex 3) of the questionnaire was tested on a sample of 20 people (N=20) prior to the field work. The purpose of the pre-test was to 1) assess if the respondents can understand the questions, the scales and the instructions, 2) to measure the time they need to complete the questionnaire, 3) obtain feedback from the respondents about their suggestions to improve the questionnaire.

The respondents were asked to answer the questionnaire, indicate the time needed for its completion, and write their comments and feedback on the above mentioned points. The returned questionnaires indeed contained important notes. The respondents were then interviewed by phone to discuss their comments in details.

The pre-test outcomes provided significant insight that added to the researchers understanding of the topic and necessitated substantial changes in the questionnaire. The definition of some indicators had to be adjusted. The measuring scale was revised as well as the sequence of some questions. Based on the pre-test findings another version was created and tested on the same sample. The results were satisfactory and the respondents' feedback was good. The time needed to complete the questionnaire was around 10 minutes in average which is a reasonable time to keep the respondent's attention span and avoid mistakes or not well thought answers (Alreck and Settle, 2004). It should be noted that the questionnaires filled during the final testing were not used for data analysis because the tested respondents gained knowledge about the topic therefore it is possible that their opinions will be biased (Alreck and Settle, 2004).

ii. External validity

External validity relates to the ability to generalize the findings of the research on bigger population (Neuman, 1997). It depends on how representative is the sample. Random sampling is the most guaranteed method to yield a sample that truly represents the whole population which in its turn is needed for generalization of the results later on (Verschuren, Doorewaard, et al., 2010).
In this research the ability to generalize the data is undermined due to two reasons. First, the sample size and second the representativeness of the sample.

As explained in the previous section due limitations in time and resources the survey could not reach the required sample size; the final surveyed sample size was 56% of required 384 customers/households. The other reason is related to the sampling method. Although the main sampling method planned for this research was random sampling, it could not be fully applied throughout the whole survey due to difficulties in the implementation phase. Instead convenience sampling was applied which poses negative effects on the ability to generalize the data as the samples selected by convenience sampling can misrepresent the population.

3.10.2 Reliability

Reliability means the dependability or consistency of the measurement method, in other words the numerical results produced by an indicator do not vary because of characteristics of the measurement instrument itself (Neuman, 1997).
For that matter, the measurement instrument (the questionnaire) used in this research offers a high degree of reliability as questionnaires are a standardized measurement instrument. More so, the questionnaire was composed of close-ended questions, open ended questions were avoided since can reduce the standardization and might reduce the option for analysis (fowler,2002).

3.11 Data analysis methods

Qualitative data collected from the questionnaires was number coded and entered to SPSS software (Statistical Package for Social Sciences). Descriptive statistical analysis i.e. means, standard deviations and frequencies were conducted to demonstrate the survey sample characters and gain an initial understanding of the measured indicators. Bivariate reliability analysis was used to test the internal consistency of the measurement scale prior to the aggregation of indicators to variables a value of Cronbach $\alpha \geq 0.6$ was considered as good indication of consistency (Sapsford and Jupp, 2006) to aggregate the indicators and compute the variables.

The variables were computed by averaging the scores obtained for the items composing the measurement scale. The value of midpoint of the 5-point Likert scale was used to evaluate the results i.e. In terms of trust measurements, mean score value above (2.5) indicates a status of "trust", while mean score value below (2.5) indicates a status of "distrust". In terms of perceived quality measurements, mean score value above (2.5) will indicate that the perceived quality is *"good"*, and mean score value below (2.5) will indicates that the perceived quality is *"bad"*.

Independent sample T-tests were also used to analyse the mean differences of measured variables between different groups of respondents

The relationship between the independent variables (process-based, goodwill-based and system-based trust) and dependent variable (perceived quality) were examined by conducting Pearson correlation tests, and simple linear regression tests.

Pearson correlation tests was used to identify the association between two variables, if a high value on one variable is associated with a high value on another that means they are positively correlated. While if a high value on one variable is associated with a low value on another that means they are negatively correlated. The strength of the correlation is expressed by the correlation coefficient (r). correlation coefficient r can take values from (+1) to (- l) the further the value of (r) is from (zero) the stronger is the association between the variables is (Sapsford and Jupp, 2006).

The correlation test simply shows that there is an association between two variables, but it does not show what is the influence of the independent variable on the dependent variable. Therefore, in order to investigate the influence on each of the elements of trust on the perceived quality, linear regression analyses were conducted. The regression analysis shows if the variations in one variable are influenced by the variation in the other while statistically controlling for the effects of extraneous variables. Regression analysis estimates or predicts the behavior of the dependent variable from the one or more independent variables better known as predictor(s) by constructing a straight line through data points of the variables on a scattergram to develop a model in the form of an equation (Sapsford and Jupp, 2006). In the

analysis of the data in this research simple regression were used and two main indicators were reported:

1. The correlation coefficient (R) which is as an estimate of how much of the variance is explained by the analysis the value of (R) ranges from (0) to (1). (R^2) gives us the proportion of the variance explained in the dependent variable by the dependent variable(s), the (R^2) is the higher is the prediction accuracy of the model. $R^2 \times 100\%$ was used to give an indication of the percentage of the variances in the dependent variable explained by the regression model.
2. The Regression coefficient (B) which indicates the contribution of the independent variables to the prediction. The values of (B) ranges from (0) to (1), the larger (B coefficient) is the larger is the effect of the independent variable on the dependent variable.

Correlation, regression and T-tests were all tested for significance or the strength of evidence by showing how likely it is that a given result is due to chance. P value of less than 0.5 was considered as significant (Sapsford and Jupp, 2006).

It should be noted that during the data collection from the field, the researcher engaged with some respondents in brief conversation about the topic in question after completing the questionnaire. These conversations provided an insight that was helpful in understanding the results and will pointed out through where relevant in the discussion of the results in chapter 4. In addition to this the researcher consulted with a number of sector officials to confirm some of the results as will be explained later.

Chapter 4: Research Findings

4.1 Introduction

This chapter presents the research findings based on the fieldwork described in the previous chapter. It starts with a brief overview of the study case in section (4.2), then with description of characteristics of the surveyed sample in section (4.3). The results will then be presented in line with the research questions in sections (4.4, 4.5 and 4.6). finally, section (4.7) the results will be related to the theory.

4.2 Description of the case

This research is based on survey of 216 public water service users in Amman. The objective of the research is to explain the extent of the influence of customers trust in the water service provider on the perceived quality of public drinking water.

The survey took place in the city of Amman which has a population of 2.6 million and enjoys a high level of water and sanitation services; 99.7% of Amman houses are connected to the public water network and 93% are connected to the sewer collection network (Miyahuna, 2015).

Public water service in Amman is provided by Miyahuna which is corporatized utility owned by the Jordanian Water Authority. Miyahuna is responsible for the operation and maintenance of water supply network, wastewater discharge network, water and wastewater treatment plants within its service area.

In terms of water quality which is the focus of this research. Miyahuna – as well as the rest of the water utilities in Jordan - is required to follow the Jordanian drinking water standards which are derived from the World Health Organization's Guidelines for Drinking Water Quality. The quality of water is tested by Miyahuna at Zai central laboratory to ensure its compliance with the national standards. In the other hand, The Water Authority of Jordan WAJ and the Ministry of Health MOH are responsible for monitoring Miyahuna's adherence to the standards and apply a quality monitoring system adopted from World Health Organization's Guidelines for Drinking Water Quality.

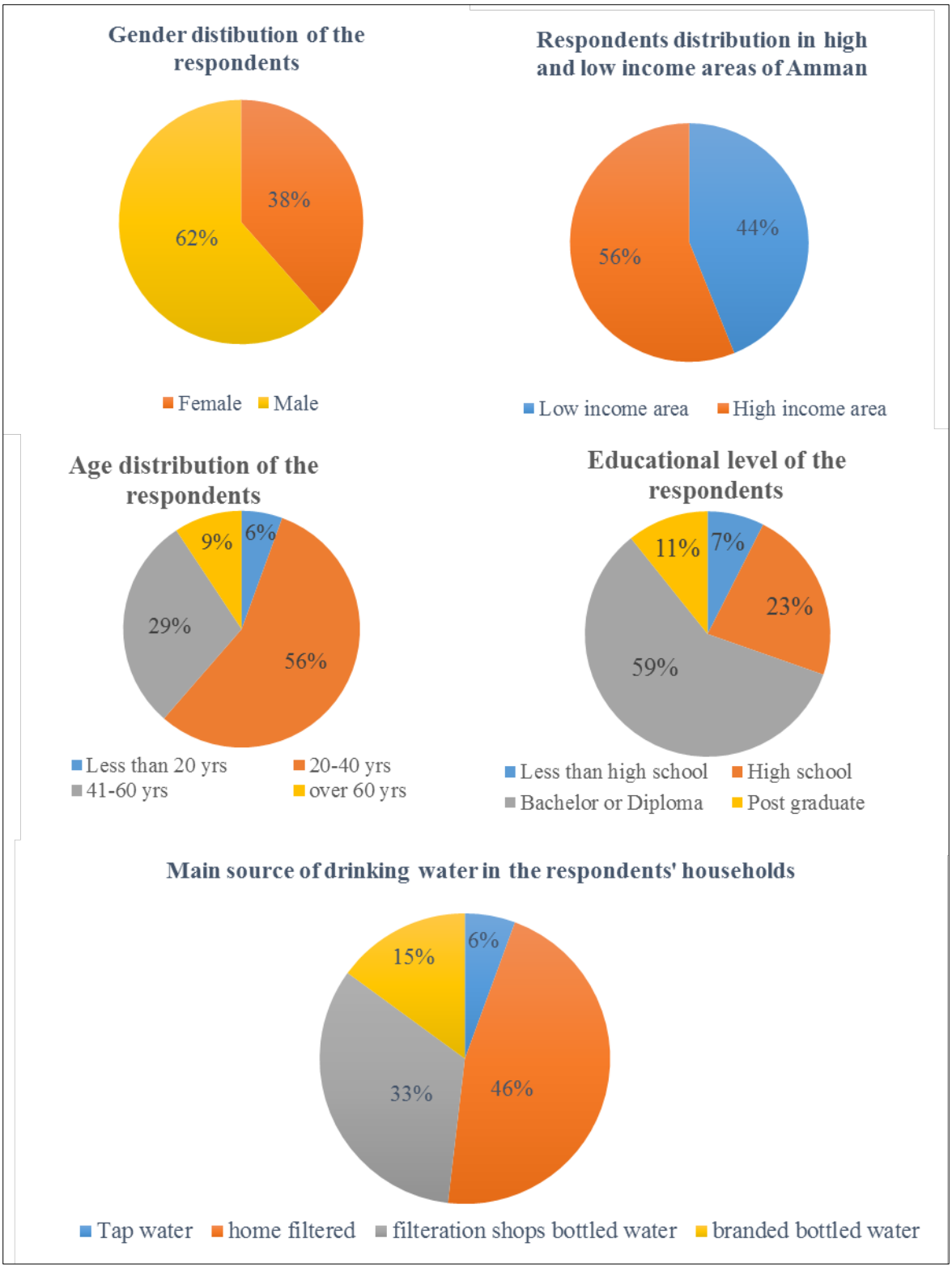
Ever since WAJ delegated its operational tasks in Amman to Miyahuna it took the role of regulatory and monitoring body ensuring the compliance to water quality standards. WAJ monitoring authority over Miyahuna are stipulated in the service agreement signed between both parties and defines the required level of service. According to the service agreement Miyahuna is obliged to report its laboratory test results to WAJ on quarterly basis and in case of local contamination incidents to report the contamination case to WAJ instantly for follow up. The assignment agreement lacks the enforcement tools i.e. WAJ cannot apply sanctions on Miyahuna in case of non-compliance. In fact, legally WAJ is the only body that will be held accountable in case of non-compliance. While the role of MOH is limited to verifying WAJ laboratory results in the course of local contamination cases or disease outbreak.

4.3 Respondents' characteristics

The area of residence, gender, age, educational level, were generally solicited from all respondents to understand how representative is the study sample of the whole population. Additionally, data about the main source of drinking water in the household was collected and that will be helpful in understanding the perception about water quality.

The summary of frequency analysis conducted to examine the characteristics of the surveyed sample are illustrated in figure (4.1). It shows that 44% of the responses were from the low income area (East Amman) and 56% were from the high income area (West Amman). The percentage of males in the sample is higher than the females, this is related to the fact for the respondent in this survey had to be the head of the household who is usually responsible for dealing with service providing companies like telephone company, electricity company and water company, and in the Jordanian culture it is mostly men (Jordanian Department of Statistics, 2006). The biggest age group was 20-40 years old, followed by 41-60 which looks similar to age distribution of the population of Jordan (social trends in Jordan). The educational level of the sample was generally high; almost 70% of the sample were university graduates, which is higher than the national (Jordanian Department of Statistics, 2006). Interestingly only 6% of the surveyed household use tap water for drinking while the rest rely either on buying bottled water or filter it at home. Earlier surveys in Jordan found that the percentage of households who use tap water is around 30% which is remarkably higher than what is found by this survey. It could be suggested that the reason is related to the high percentage of high income households in this survey who normally have more capacity to buy bottled water, however earlier studies (KFW, 2008) have also found that using bottled water in Jordanian households in not related to the income level. Thus it can only be suggested that the number of people who use tap water has actually decreased over time.

Figure 4. 1: Summary of the sample characteristics analysis



4.4 The level of customers' trust in the public water service provider (Miyahuna).

Customer trust in the service provider as explained in the previous chapter, is composed of three main elements: process-based, goodwill-based and system-based trust. The level of customers trust in Miyahuna is thus defined by the level of process-based, goodwill-based and system-based trust. In the following subsections results obtained for each of those elements

will be discussed by first explaining how it was measured and then presenting the results of the data collected.

4.4.1 The level of Process-based trust

Process-based trust was defined as customers' confidence in Miyahuna's competency, dependability and reliability in service delivery. Process-based trust measurement scale was composed of 4 items adopted from a guideline for trust measurement in organizations developed by the Institute for Public Relations [2] (2013). The respondents were asked to indicate on 5-point Likert scale the extent to which they agree or disagree with the following statements.

Table 4. 1: Level of process-based trust

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. I'm confident that Miyahuna has the skills and experience needed to deliver its services.	1	2	3	4	5
2. I'm confident that Miyahuna has the skills and experience needed for water treatment.	1	2	3	4	5
3. I feel that confident that Miyahuna can be depended on to deliver the service in a consistent manner.	1	2	3	4	5
4. In my dealings with the Miyahuna I feel confident that they will accomplish what they say they will do.	1	2	3	4	5

The summary of responses is depicted in figure (4.2) and the measured mean scores of each item is depicted in table (4.1).

The mean scores indicate clearly indicate that the respondents had in general a moderately positive opinion of Miyahuna's competency, dependability and reliability in service delivery. by looking at tale (4.1) it can be seen that all the scale item mean scores were above (2.5). It can also be noted that opinions on reliability were the least positive, which is also clear from comparing the combined percentages of the respondents who chose "Agree" and "Strongly agree". The percentages were 64%, 57% and 68% for statement 1,2 and 3 respectively while it was only 41% for statement 4.

A good number of respondents related reliability to Miyahuna's commitment to the weekly water supply schedule. As explained before in section (2.6.1) the households in Amman receive public water on assigned days of the week and for a limited number of hours. At the beginning of each season Miyahuna announces which day of the week each neighbourhood will get water. During the dry and hot summer months a higher demand for water that exceeds the production capacity of the available resources causing disruption in the service. As a consequence, many neighbourhoods in Amman do not get water on the assigned day or for the assigned duration. Given that this survey took place during the summer period, this could explain why some respondents did not feel confident that Miyahuna accomplishes what they say they will do.

The scale items (Cronbach's $\alpha = 0.721$) were compounded by averaging the scores to compute the level of process-based trust. the result presented in table (4.1) indicates that customers have a fair level of process-based trust.

[2] Institute for Public Relations a is non-profit foundation dedicated to research in public relations in USA

Figure 4. 2: Summary of responses on process-based trust measurements

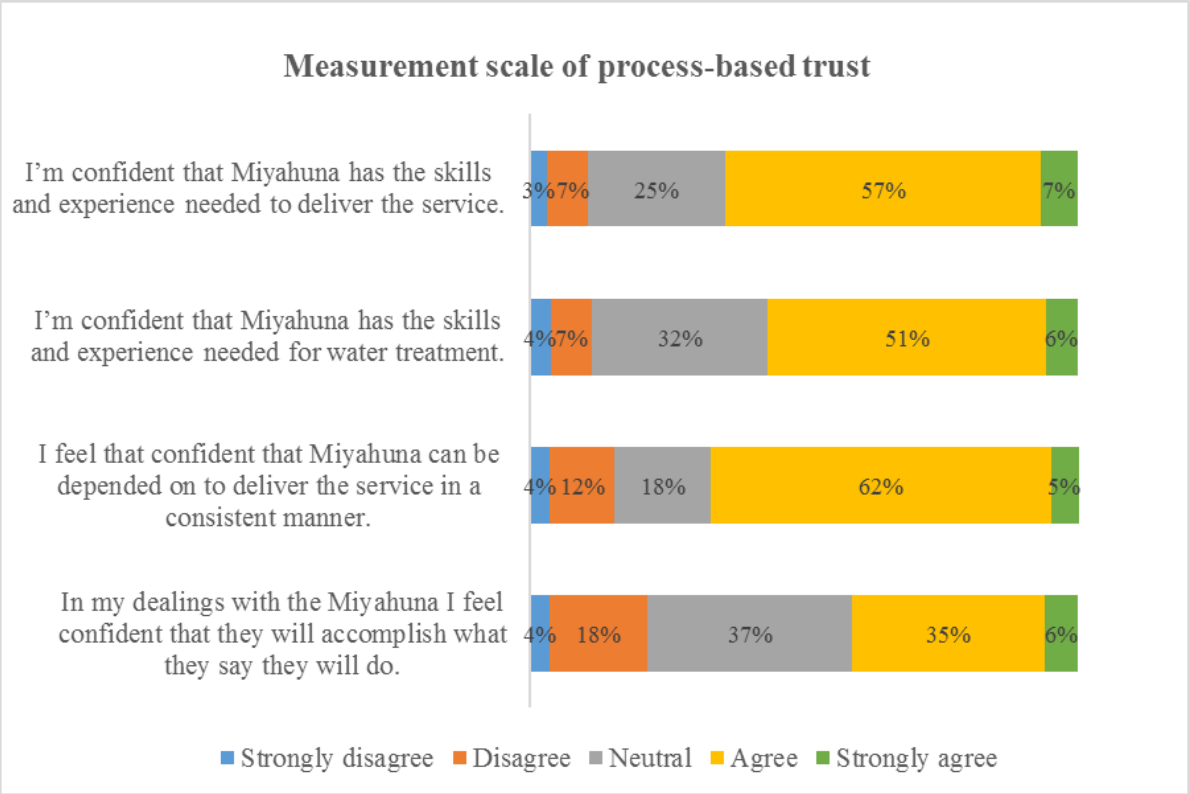


Table 4. 2: Summary of process-based trust scores.

	M	SD	n
General competency	3.57	0.854	216
Water treatment competency	3.47	0.869	203
Dependability	3.53	0.901	215
Reliability	3.22	0.935	215
Process trust	**3.45**	**0.632**	**201**

4.4.2 The level of goodwill-based trust

Goodwill-based trust was defined in chapter 3 as customers' belief in Miyahuna's fairness, integrity and honesty in dealing with its customers. The measurement scale was composed of 3 items adopted from (Institute of Public Relations, 2013). The respondents were asked to indicate on 5-point Likert scale the extent to which they agree or disagree with the following statements.

Table 4. 3: Level of goodwill-based trust

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. In my dealings with Miyahuna I believe that I'm being treated justly and fairly	1	2	3	4	5
2. I believe that Miyahuna deals with me with integrity (I don't believe Miyahuna is opportunistic)	1	2	3	4	5
3. In my dealings with Miyahuna I believe that it is being honest and clear with me.	1	2	3	4	5

An examination of the mean score values depicted in table (4.2) and the frequency of responses depicted in figure (4.3) indicate that the respondents held moderately positive views of Miyahuna's integrity and honesty, combined percentage of those who chose "strongly agree" and "agree" with statement 2 and 3 were 47% and 53% respectively. respondent's' opinions about Miyahuna's fairness in dealing with its customers were remarkably less positive where only 39% of respondents chose "strongly agree" or "agree" with statement (1). It seems that customers related fair treatment to the duration of water supply as stated by one of the respondents who explained "not all the areas in Amman receive the same duration of water supply, my relatives who are living in another area get water for 2 days a week while I get water for only one day or less sometimes".

The scale items (Cronbach's $\alpha = 0.773$) were compounded by averaging the scores to compute the level of goodwill-based trust. the result presented in table (4.1) indicates that customers have a fair level of goodwill-based trust.

Figure 4. 3: Summary of responses on goodwill-based trust measurements

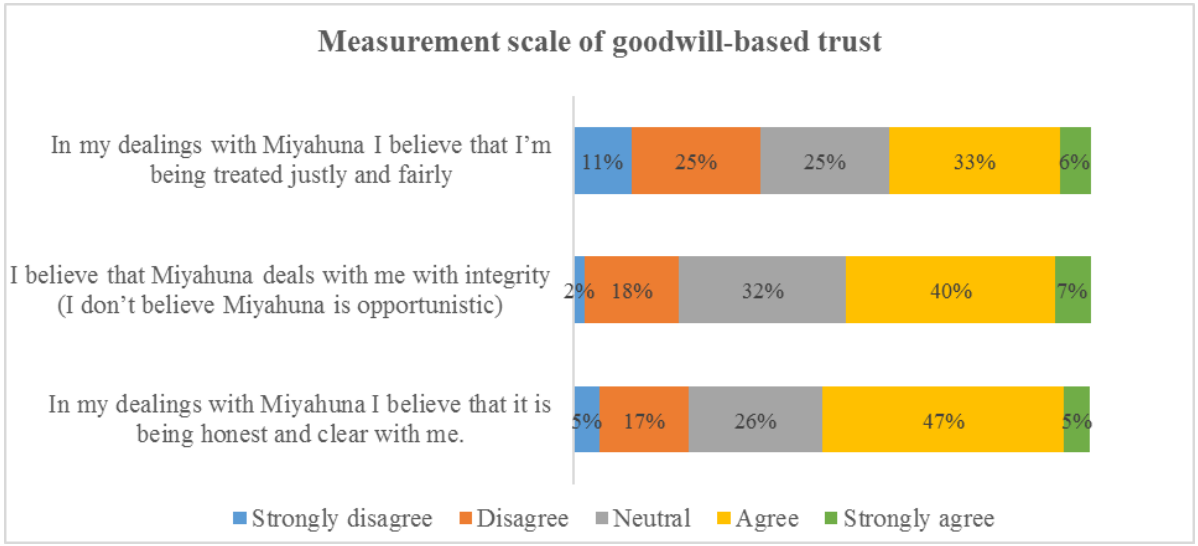


Table 4. 4: summary of goodwill-based trust measurements.

	M	SD	n
Fairness	2.98	1.129	215
Integrity	3.31	0.927	216
Honesty	3.29	0.985	214
Goodwill trust	**3.20**	**0.844**	**213**

4.4.3 The level of system-based trust

System-based trust was defined previously as customers' confidence in the efficiency of regulatory agencies namely WAJ and MOH in monitoring Miyahuna's adherence to drinking water quality standards.

This element of trust needed to be approached differently than the previous two. This became obvious during the pre-testing phase of the questionnaire. When asked about their opinion of WAJ and MOH efficiency in monitoring Miyahuna, some respondents indicated that they did not know that WAJ or MOH are responsible for that. Some even mentioned that they never knew that there are water quality monitoring agencies at all. Therefore, asking such respondents to give their opinion about WAJ and MOH monitoring efficiency will not be reasonable or valid. In fact, asking someone to give their opinion about something they don't have knowledge about is considered one of the biggest mistakes that can significantly undermine the validity of the answer. According to Alreck and Settle (2004) the respondent's knowledge of the matter of question is critical in order to measure how they really feel about it. They explain that asking someone to express his/her feelings about something he/she doesn't know will produce false answers, as most respondents will pretend to know the subject rather than not answering the questions or saying that they don't know. For this reason, it important to assess the respondents' knowledge of the topic in questions before asking about their opinions about it. The authors suggest using the Unaided Recall Method to gradually extract the respondent's knowledge about the topic.

In line with this learning, the following steps were introduced to the questionnaire to assess the respondents' knowledge about water quality monitoring agencies thus filter out those respondents who don't know about the existence of the regulator and therefore, are not eligible to evaluate it.

Step 1: the subject of water quality monitoring was introduced by asking the respondents how important they think it is to have a monitoring agency for ensuring water quality. This was done by asking them how much they agree or disagree on a 5 point Likert scale of the following statement,

Table 4. 5: Level of system-based trust Step 1

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I think it is necessary to have an agency monitoring Miyahuna closely to ensure the quality of water.	1	2	3	4	5

The vast majority (88%) of respondents indicated that it is important to have a regulatory agency with a remarkably high percentage of 57% of the respondents answered with "strongly agree" and 31% answered with "agree".

Step 2: The respondent was asked "according to your knowledge, is there an agency monitoring Miyahuna's water quality?" (Yes) or (No). Only 29% of the respondents (62 respondents) answered by yes while the rest answered by (No).

Step 3: Those who answered by (Yes) were asked to write down the name of this regulatory agency in an open ended question. The results showed that 60% of them mentioned WAJ and/or MOH while the rest mentioned different agencies i.e. Department of Food and Drug Administration JFDA, Standards and Metrology Organization JSMO, Customer Protection Association CPA. It should be noted that a 36 respondents answered by (Yes) in step 2 but did not provide the agency name in step 3. Those cases indicated that those respondents probably did not know there is a regulator but answered (yes) anyway therefore their answers converted to (No). the above mentioned 25% is excluding those cases.

Although it was expected that some respondents do not have a knowledge of the existence of a regulatory or monitoring agency for water quality, however it was not expected that the percentage will be as high. To confirm the results, the director of water quality affairs of WAJ was consulted in this matter. She related this result to the lack of public communication from the part of WAJ about water quality. She noted that "there is a general lack of communication about water quality issues in the Jordanian sector. The public don't get any information about where their water comes from, how is it treated, or about the monitoring routine. also, and there is no regular reporting on water quality status to the public. The public hears about water quality only when there is a contamination case. No matter they have a negative perception of water quality. After Zai incident drinking water quality has been a touchy subject that the officials prefer to say less about it to avoid trouble".

Step 4: Only those respondents who provided an agency name were allowed to proceed to the following step which is giving their opinion about the agency they named by presenting to the respondents the following statements. It should be noted that respondents who named agencies other than WAJ were included in this step because the purpose is not to evaluate WAJ in particular it is rather to know the influence of confidence in a regulatory body.

Table 4. 6: Level of system-based trust Step 4

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. This agency is monitoring the water quality on regular basis.	1	2	3	4	5
2. This agency will take the right measures against Miyahuna in case they did not comply with water quality standards.	1	2	3	4	5
3. Having this agency makes me assured of the quality of water I receive at home.	1	2	3	4	5
4. I believe what this agency tells us about water quality	1	2	3	4	5

The results depicted in figure (4.4) and table (4.3) show a general moderately positive opinion about the regulatory agency. 71% of the customers are confident that there is regular monitoring on Miyahuna as can be seen from the mean score and the combined responses of "strongly agree" and "agree" on statement (1). 56% of the customers showed confidence in the agency's credibility and 62% feel that having this agency assures them of the water quality as can be seen from the combined responses of "agree" and "strongly agree" with statement 4 and 3 respectively. Opinions about enforcing compliance to water quality standards were however

the least positive. In this regard some respondents explained that "Miyahuna is a subsidiary of WAJ. Therefore, it is highly unlikely that WAJ will take any measures against Miyahuna, it will be like applying sanctions to yourself". The director of legal department at WAJ was consulted on this matter, he explained that "by law, WAJ is the only body that can be legally held accountable for any consequences associated with distributing water of bad quality to the public. In addition to that the assignment agreement signed between Miyauna and WAJ only does not include any clauses that allows WAJ to take actions against Miyauhna in case it does not comply with any of the conditions of service delivery including the compliance to the water quality standards"

The four items on the measurement showed a good reliability (Cronbach's $\alpha = 0.858$) and were averaged in a composite measure of system-based trust. the result depicted in table (4.3) indicates a fair level of system-based trust.

Figure 4. 4: Summary of responses on system-based trust measurements

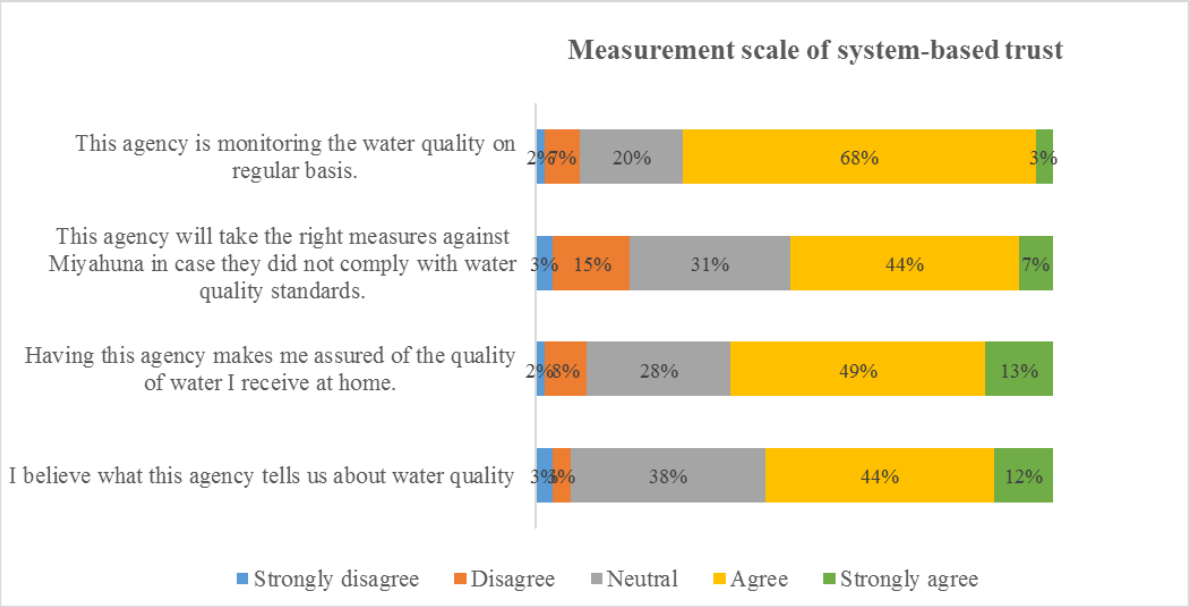


Table 4. 7: Summary of system-based trust measurements.

	M	SD	n
Monitoring efficiency	3.65	0.732	60
Compliance enforcement	3.36	0.932	61
Assurance of quality	3.54	0.876	61
Credibility	3.57	0.865	61
System trust	**3.40**	**0.632**	**60**

4.5 The current perceived quality of tap water in Amman.

Perceived quality was defined in chapter 3 as the customer's evaluation of water quality attributes which are the colour, odour, taste and safety expressed as biological safety, chemical safety and radiological safety. Radiological safety was of special focus in this research as the

people of Jordan have been lately very concerned about the radiological content of a new water source that is being used for drinking water supply to the city of Amman.

The evaluation of water quality was done in two parts. First, respondents were asked to evaluate water colour, odour, and taste on 5-point Likert scale (1=very bad, 5=very good) as shown below.

Table 4. 8: Current perceived quality of tap water in Amman i

	Very bad	Bad	Neutral	Good	Very good
1. What is your evaluation of water colour	1	2	3	4	5
2. What is your evaluation of water odour	1	2	3	4	5
3. What is your evaluation of water taste	1	2	3	4	5

The second part which is related to the evaluation of water safety required a different approach because water safety is not as easy to evaluate. In fact, safety is considered as a hidden attribute (Jun and Jolibert, 1983). Unlike the colour, odour and taste (revealed attributes) one cannot evaluate safety through the senses but rather creates beliefs about it through the information he/she receive from the surrounding environment (Steenkamp, 1990). Therefore, water safety evaluation was done by presenting to the respondents the list of statement shown below to indicate their level of agreement on 5- point Likert scale (reversely scored).

Table 4. 9: Current perceived quality of tap water in Amman ii

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. I think that tap water might contain germs, microbes or bacteria	1	2	3	4	5
2. I think that tap water might contain harmful chemicals	1	2	3	4	5
3. I think that tap water might contain radioactive matter	1	2	3	4	5

Most of respondents regarded water colour and odour as good as can be seen from the combined percentage of respondents who chose “good” and “very good” in figure (4.5), (84%) and (75%) for water colour and odour respectively. Views on water taste were different; only (58%) of the respondents regarded it as good. These results go in line with the previous surveys (KFW, 2008, Eco Consult, 2010) where people complained that the water contained too much salt and chlorine, giving it an unfavourable taste.

On the other hand, evaluations of water safety were not as positive. (48%) of the respondents had concerns about tap water containing harmful bacteria and (36%) of the respondents had concerns about the presence of harmful chemicals as can be seen from the combined percentage of respondents who chose “agree” and “Strongly agree” in figure (4.7). In this regard some respondents mentioned that “tap water is transported through pipelines and stored in tanks, it will surely get in contact with germs or bacteria through the way”, or “water is contaminated

with chlorine". Those results echo the findings of earlier studies on water quality perception in Amman and Jordan (Potter, Darmame, et al., 2010, KFW, 2008) .

As mentioned in chapter 2 section (2.6.6), radiological safety was of particular focus in safety evaluation in this research. According to officials in water sector, customers have been lately very concerned about high radio-active concentration in the one of the major water sources, an issue which is becoming a "hot topic" in social circles. Surprisingly though, the results of radiological safety perception were better than expected; only 16% of the surveyed customers expressed concerns about the presence of radioactive matter in their water, compared to almost double that percentage of customer were concerned about biological and chemical safety were. But on the other hand, water safety is hard to for a lay person evaluate which explains the higher percentage of "neutral" answers. Nevertheless, the authorities distress about public perception of radiological safety is justified as the health risk associated with radio-active matter are much more significant than those associated with germs and chlorine.

The overall quality evaluation (perceived quality) was computed by averaging the scores of all the six attributes. The result depicted in table (4.4) shows that perceived quality mean score value was (3.04) which indicates that water quality is perceived as fairly good. Obviously this does not go in line with the respondents' views explained above. The reason could be that equal weights were assumed for all the six attributes to compute the overall perceived quality, whereas it would have been more sound to assign weights based on the respondents' assessment of the importance of each attribute, but this was not done to keep the questionnaire simple.

Figure 4. 5: Summary of response on water colour, odour and taste evaluation

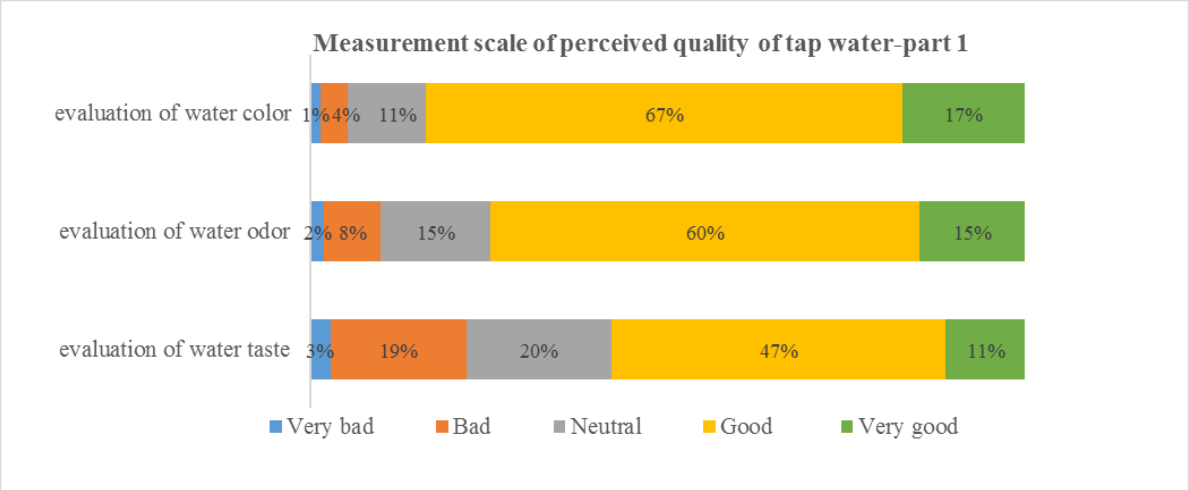


Figure 4. 6: Summary of response on water safety evaluation

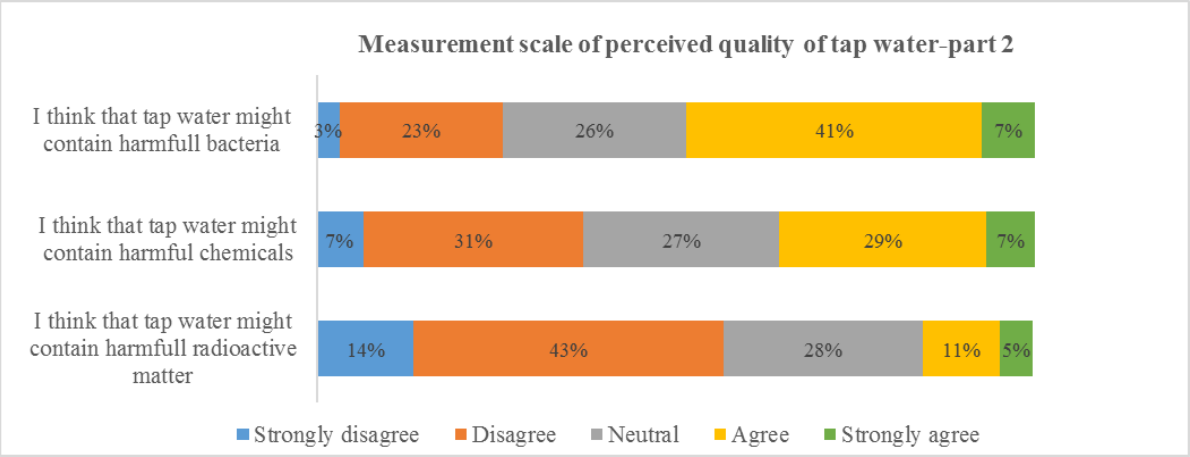


Table 4. 10: Summary of perceived quality measurement.

	M	SD	n
Color	3.94	0.745	216
Odor	3.78	0.859	216
Taste	3.44	1.010	216
Biological safety	2.73	0.999	216
Chemical safety	3.01	1.065	216
Radiological safety	3.51	1.012	216
Perceived quality	**3.04**	**0.632**	**216**

4.6 The influence of process-based, goodwill-based and system-based trust on the perceived quality of tap water

In this section the variables measured in the previous section will be employed in different statistical tests to examine the influence of each element of trust on perceived quality and answer the research sub-questions.

In subsection (4.4.3) it was explained that the respondent's knowledge about the existence of regulatory agency was a major determinant in measuring the system-based trust. It can be assumed that for the group of respondents who did not know there is a regulatory agency the element of system-based trust is nonexistent. Thus, trust in the service provider for this group is generated from two sources only; namely process-based and goodwill-based trust. whereas for the other group of respondents knew there is a regulatory agency, trust in the service provider is generated from all three sources. Thus it is not logical to treat both groups the same. Therefore, to obtain a meaningful analysis, those two groups of respondents had to be treated

separately in the data analysis. Group A represents the respondents who did not know there is a regulator (154 respondents) and Group B represents the respondents who knew there is a regulator (62 respondent) and were able to score system-based trust.

In order to avoid variation in the results due to the disproportionate sizes of both groups, a third group (Group C) was created by selecting 62 respondents from Group A, this was done by using a random sampling function in SPSS. An examination of the characteristics of the respondents from both groups (B&C) showed similar characteristics in terms of age, educational level, gender and income level.

The means and standard deviations of the independent and dependent variables measured in the previous sections were recalculated for each group and the results are summarized in table (4.5). An independent sample T-test showed no significant differences in the mean scores of shared variables between both groups (process trust, $t(-1.39) = -0.177$, $p > 0.05$), (goodwill trust, $t(0.584) = 0.905$, $p > 0.05$), (perceived quality, $t(0.288) = 0.323$, $p > 0.05$).

Table 4. 11: Independent and dependent variables calculated per group

Variables	Group B			Group C		
	M	SD	n	M	SD	n
Process trust	3.56	.700	57	3.39	.653	56
Goodwill trust	3.19	.851	60	3.29	.860	62
System trust	3.60	.690	59	----	----	---
Perceived quality	3.43	.620	62	3.47	.628	62

The statistical tests and data analysis were thus conducted on two distinct groups; **Group C and Group B**. the same test procedure was applied to both groups. First Pearson correlation test was conducted to examine nature and the strength of association between each element of trust and the perceived quality, then a simple linear regression analysis was conducted to examine the influence of each element of trust on the perceived quality. The summary of those tests results is illustrated in tables (4.6 and 4.7). Details of the statistical tests are included in Annex (4).

Table 4. 12: Summary of Pearson correlation test results

Pearson Correlations coefficient	Group B	Group C
Process-based trust × perceived quality	0.319*	0.456*
Goodwill-based trust × perceived quality	0.243	0.409*
System-based trust × perceived quality	0.518*	---

* P value < 0.05

Table 4. 13: Summary of simple linear regression analysis results

Simple linear regression	Group B		Group C	
	(b)	(R^2×100%)	(b)	(R^2×100%)
Process-based trust × perceived quality	0.279*	10.2% *	0.445 *	20.8% *
Goodwill-based trust × perceived quality	0.175	5.90%	0.299 *	16.7% *
System-based trust × perceived quality	0.508 *	26.8% *	---	---

* P value < 0.05, (b) is Regression coefficient, (R^2×100%) is Prediction strength.

4.6.1 Influence of process-based trust

As can be seen from Pearson correlation test results in table (4.6) process-based trust in both groups was significantly positively correlated to perceived quality, indicating that respondents who had higher levels of process-based trust tended to have a more positive perceived quality of water. Looking at the regression analysis results in table (4.7) it is clear that, in both groups perceived quality is significantly influenced by the variations of process-based trust levels across the respondents. The magnitude of that influence was different between both groups. In group B, perceived quality scores increased by (0.279) units with every1-unit increase in process-based trust score. In group C, perceived quality scores increased by (0.445) units with every1-unit increase in process-based trust score.

4.6.2 Influence of goodwill-based trust

Goodwill-based trust was also found to have a positive correlation with perceived quality in both groups as can be from the Pearson coefficient values in table (4.6). Pearson coefficient values have to be assessed hand in hand with the significance level (P value) which represents the strength of statistical. In group B, the correlation showed a significance level while in group C the correlation was below the significance threshold indicating that the correlation could have been due to chance.

Correlation results give an indication of what would be expected in the regression analysis. Which is obvious when looking at the regression analysis results which show that in both groups, perceived quality is influenced by the variations of goodwill-based trust levels. In group C, perceived quality scores significantly increased by (0.299) units with every1-unit increase in goodwill-based trust, while in group B it increased by (0.175) with a questionable significance level.

4.6.3 Influence of system-based trust

Pearson correlation test proved that system-based trust is significantly positively correlated to perceived quality. Which means that respondents who had higher levels of system-based trust gave more positive evaluation of water quality.

Similarly, the regression test results show that the variation in perceived quality were significantly explained by the variation in level of system-based trust. Perceived quality scores significantly increased by (0.518) units with every1-unit increase in system-based trust.

Now that influence of each element of trust is explained, it is time to explain **what is the combined influence of those elements on perceived quality?**

In order to answer this question, it is important to remember that those elements although treated individually in this research do not exist in real life in isolation of each other. Those

elements as mentioned in chapter (2) are inter-related and mutually reinforcing (Johnson and Grayson, 2000). To prove this, Pearson correlation test was conducted to examine the relationship between those three elements. The results which are summarized in tables (4.8, 4.9) and further detailed in Annex (4) clearly show a highly significant positive correlation between process-based, goodwill-based and system-based trust.

The existence of a correlation between the independent variables means that their influence on the dependent variable will overlap (Sapsford and Jupp, 2006). This means that the combined influence of trust on perceived quality does not equal the sum of influence of each element.

Table 4. 14: Summary of Pearson correlation test between trust elements in group B

Pearson correlation coefficient - Group B			
	process-based trust	goodwill-based trust	system-based trust
process-based trust	1		
goodwill-based trust	.592*	1	
system-based trust	.610*	.241	1

* P value < 0.05

Table 4. 15: Summary of Pearson correlation test between trust elements in group C

Pearson correlation coefficient - Group C		
	process-based trust	goodwill-based trust
process-based trust	1	
goodwill-based trust	.721*	1

* P value < 0.05

4.7 Reflection on the results

From the previous discussion, it was obvious that all the three elements of customers' trust in the service provider have an influence the perceived quality of water. But it was also observed that extent of this influence varies between the elements. In this section, we try to explain and justify these observations.

Observation 1: Goodwill-based trust was the element of trust that had the least influence on perceived quality.

Looking at the regression coefficient values (b) and the prediction strength (R^2) depicted in table (4.7), we notice that goodwill-based trust had the lowest values compared to the rest of the elements in each group, and the same goes for the correlation coefficient values in table (4.6). In both groups, goodwill-based trust ranked last after process-based and system-based trust in terms of the strength of its correlation with the perceived quality, and the magnitude of its contribution and prediction strength of the variation in the perceived quality.

This result was expected. As explained earlier in section (2.3.2) trust has two dimension; the cognitive and the affective. Johnson and Grayson (2000) related process-based and system-based trust to the cognitive dimension, and related goodwill-based trust to the affective dimensions (see figure 2.2). they also noted that, in service relationships the influence of the cognitive dimension is more likely to be dominant and further proved it in an empirical study on the role of cognitive and affective trust in financial service relationships. (Johnson and Grayson, 2005).

Observation 2: System-based trust had the strongest influence on perceived quality.

looking at Pearson correlation values across both groups (table 4.6), we can see that system-based trust had the highest value, which indicates that system-based has the strongest correlation with perceived quality. Similarly, regression analysis results (table 4.7) showed that system-based trust is the element of trust that has the highest contribution to and prediction strength of the variation in the perceived quality.

While there is a clear explanation to why system-based trust is more influential than goodwill-based trust, there is no direct explanation in the literature to why the system-based trust is more influential than process-based trust. Unfortunately, the model of the element of trust introduced by Johnson and Grayson (2000) and adopted in this research was not employed in any empirical studies that can help in explaining this result.

In an effort to understand this this result, let's go back to chapter (2) section (2.4.4). We can see that, one of the main factors that affect the perceived quality of a certain product is the perceived risk associated with the its use or consumption. Starting from this piece of information, further literature reviewed revealed that risk perception and trust are closely related. In fact, some scholars consider trust to be an antecedent of risk perception (Poortinga and Pidgeon, 2003). Das and Teng (2004b) explain the link between trust and risk perception as follows; the logic of risk includes uncertainty and probability and trust is about future expectations which by definition is uncertain and risky. Some scholars have argued long ago that it is only in situations of risk where trust is needed (Schlenker, Helm, et al., 1973). This note goes in line with the definition of trust stated earlier in chapter 2. *Trust is an expectation, belief or confidence that the trustee will perform in the manner that will produce positive results for the trustor in situations of possible risk and vulnerability (castadelo).*

Bratanova, Morrison, et al. (2013) suggested that the effect of trust on perceived quality is mediated through the risk perception and further proved in their empirical research on the municipal water quality in Sweden that trust in the water supply authorities was found to directly predict consumers' perception of risk associated with water use, which in turn predicted their evaluation of the water quality. Another research in food retailing industry proved that trust in food retailer strongly predicted the risk perceived by the consumers (Viktoria Rampl, Eberhardt, et al., 2012).
looking the three elements of trust from the perspective of risk it could be suggested that efficiency of the regulatory system is the element of trust that the customers most related to the aversion of this risk. Thus it had the highest influence on perceived quality.

Another presumed reason for the higher influence of system-based trust on perceived quality as compared to the process-based trust element could be related to influence of the measurement scale used for system-based trust and process-based trust on the regression analysis. Going back to sections (4.4.1) and (4.4.3) we can see that items used to measure system-based trust were all focused on water quality aspects while process-based trust items

were not as specific to water quality[3] which might have caused higher correlation and prediction power of perceived trust. To investigate the effect of the measurement scale on the results, the regression analysis of process-based trust and perceived quality was repeated taking only item (2) of the scale which represents "respondents' confidence in Miyahuna's water treatment competence" as a predictor for perceived quality. The results shown in table (4.8) don't show any significant difference than the results obtained with full scale regression analysis shown in table (4.7) which highly excludes this reason.

Table 4. 16: Results of repeated regression analysis for process-based trust

Simple linear regression	Group B		Group C	
	(*b*)	(R^2×100%)	(*b*)	(R^2×100%)
Water treatment competency × perceived quality	0.253	10.10%	0.364	20.20%

*P value > 0.05

Observation 3: Process-based trust influence on perceived quality in group was considerably higher than its influence in group B.

It was noticed from the results in table (4.7) that the influence of process-based trust on perceived quality in group C (b = 0.445) was considerably higher than its influence in group B (b = 0.279).

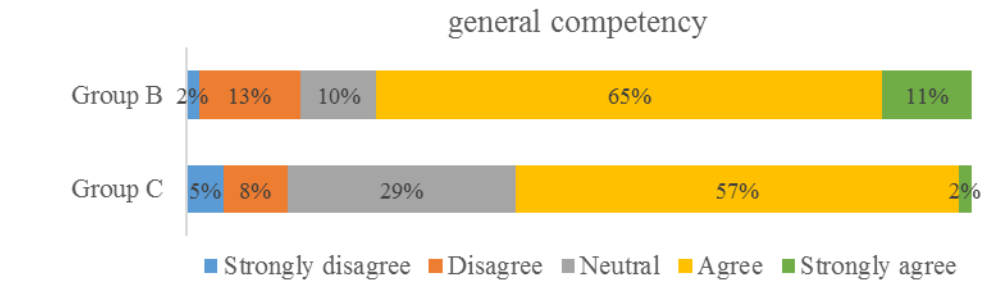
It is possible that the knowing that there is an efficient regulatory agency played a role in this. Having the guards of a regulatory body provided the customers with an implicit guarantee of the service provides competence. Thus group B respondents' focus is shifted into how well is this regulatory system is performing rather than how competent is the service provider. The opposite can be said about groups C whose respondents do not have that guarantee and are thus more focused on the competence of the service provider. It is also possible that this is the reason why group C level of Process-based trust (M = 3.38) is lower than group B level of Process-based trust (M = 3.56).

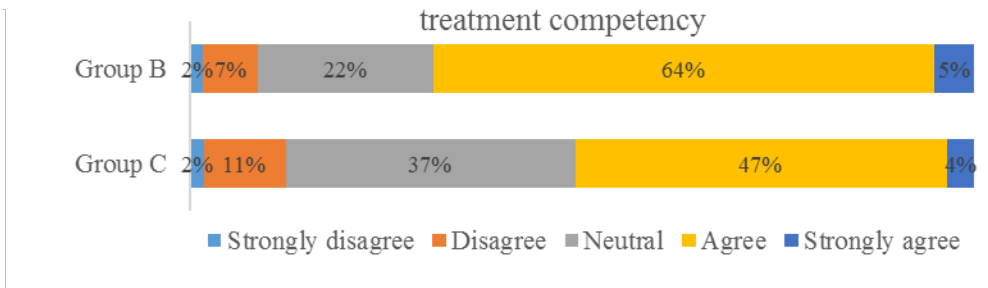
To get more insight on the differences of the level of process-trust between both groups, the scale was analysed item by item. Item scores were compared between both groups see figure (4.7). In general, it can be observed that group B responses were more positive. Not only that but it can also be notices that group B responses were more decisive or in other words they had less "neutral" response. Knowing that "neutral" answers mainly indicate that the respondents are not sure about how they feel about the topic of the question (Sapsford and Jupp, 2006), it could be suggested that respondents from group B who had system-based trust had more confidence in Miyahuna's competence in water treatment because they knew that there is an agency monitoring its compliance to water quality standards. The opposite can be said about the respondents of group C who thought that there isn't any monitoring agency so they were less confident of or less sure about Miyahua's competence in water treatment.

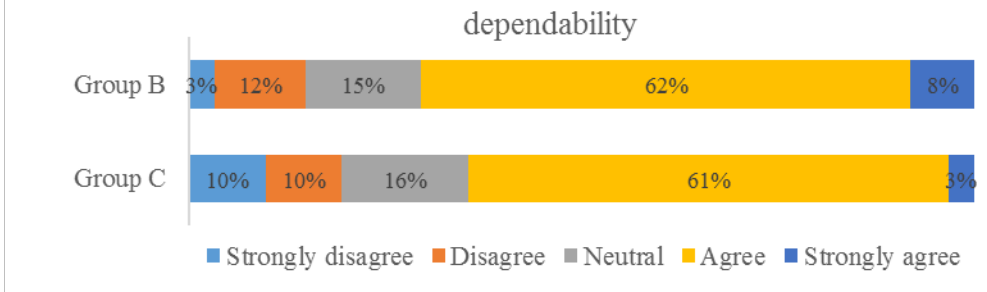
On another note, it also should be taken into consideration that "neutral" answers could also indicate neutral opinions. Neutral opinions are not surprising given that the majority of respondents (94%) do no use publicly supplied water for drinking, therefore it is possible that they don't really notice water quality related issues as they don't drink it anyway. If this is the case, then it could only be suggested that group B respondents were more conscious about water quality issues thus they had the curiosity to know about the regulator.

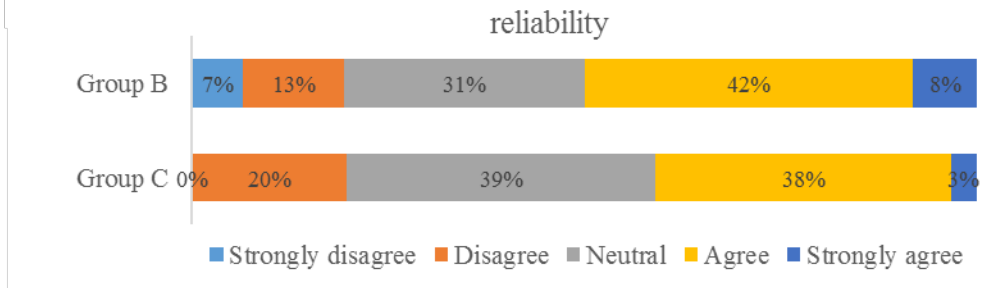
[3] The measurement scales were tested and adjusted multiple times during the questionnaire. The pilot version of the questionnaire is attached in Annex (3)

Table 4. 17: Comparison of group B & C responses on process-based trust









Chapter 5: Conclusions and recommendations

This research addresses the challenges that the Jordanian Water Authority WAJ and Miyahuna (the water utility in Amman) are facing in regaining customers' trust, and improving the perceived quality of public drinking water. In Amman, even though the drinking water quality is in full compliance to national standards and WHO guidelines (Properzi, 2010) the public perceive the water quality as poor and unsafe (Potter, Darmame, et al., 2010, Miyahuna, 2011, Miyahuna, 2012). Water sector officials relate this negative perception of water quality to the decline of customers' trust in public water institutions after a contamination incident in one of Amman's major water treatment plant twenty years ago. To help address this challenge this research aimed at explaining the extent to which trust is influencing customers' perception of water quality.

The conceptual framework for this research was anchored on the micro-performance theory which associates higher levels of public trust in public service institutions to better perceived quality of the services delivered by those institutions (Bouckaert and Van de Walle, 2003). And on a model for customers trust in the service provider developed by Grayson and Johnson (2000). In this model customers trust in the service provider is seen as being composed of three elements, namely a) process-based trust in which customers trust is generated from the service provider's competency of in service delivery, b) goodwill-based trust where trust is generated from services provider's show of good faith and integrity in dealing with its customers and c) system-based trust which is generated from the efficiency of regulatory system governing the service delivery in enforcing service standards. In this research the extent of each element's influence on perceive quality was investigated and explained. Understanding the extent of each elements influence can provide a helpful insight to the policy makers to develop strategies in targeting the most influential element thus effectively improve those perceptions.

In the following sections, the main findings and conclusion drawn from field data analysis detailed in the previous chapter will be highlighted along the lines of the research questions and the research objective.

5.1 Main findings of the research

5.1.1 The level of customers' trust in Miyahuna

As mentioned above, customers trust in Miyahuna had been conceptualized as composed of three elements, process-based, goodwill-based and system-based trust. Field results showed that customers had generally a fair level of trust in Miyahuna.

On a scale (1-5), the level of process-based trust was (3.45) indicating that customers had a fair level of confidence in Miyahuna's competency, dependability and reliability in service delivery. The level of goodwill-based trust was (3.20) indicating a fair level of belief in Miyahuna's fairness, integrity and honesty in dealing with its customers. Confidence in the efficiency of WAJ and MOH in monitoring and enforcing Miyahuna's adherence to the water quality standards was at similar levels, as system-based trust level was (3.40).

With the absence of any direct or indirect previous measurements of trust in water related institutions in Jordan, there was no reference to compare these results to, thus it was not possible to tell if the trust levels are declining as the sector officials claim.

5.1.2 The current perceived quality of public drinking water in Amman

Perceived quality of water which was assessed based on colour, odour, taste, biological, chemical and radiological safety. The results showed that water colour, odour and taste were perceived as being good. The views about water safety however, were different. The results confirmed the concerns about water biological and chemical safety stated in former studies (Eco Consult, 2010, KFW, 2008, Potter, Darmame, et al., 2010) as more than third of the respondents believe that tap water contains harmful bacteria and chemicals like chorine.

As mentioned earlier, radiological safety was another safety concern that has recently been exchanged in the social circles causing a great distress to the related authorities. Contrary to what was expected; only 20% of the surveyed customers expressed concerns about the presence of radioactive matter in their water, compared to almost double that percentage of customer were concerned about biological and chemical safety were. But the authorities distress about public perception of radiological safety is justified as the health risk associated with radio-active matter are much more significant than those associated with germs and chlorine.

5.1.3 The extent of influence of different trust elements on the perceived quality of water.

The results proved that trust significantly influences the perceived quality as hypothesized by the micro-performance theory. The survey results clearly showed that respondents who had higher levels of trust in Miyahuna had more positive perception of the water quality.

The results also showed that all three elements of trust had significant influence on the perceived quality. However, the magnitude of the influence varied between the elements. System-based trust is the element of trust that had the biggest influence on perceived quality. Process-based trust had the second biggest influence and goodwill-based trust had the least influence.

It was expected that goodwill-based trust will have a modest influence compared to the other two elements. This was explained by the dimension of trust each of those elements is related to. According to earlier studies, scholars have identified two dimensions for trust; the cognitive dimension and the affective dimension. Johnson and Grayson (2000) related process-based and system-based trust to the cognitive dimension, and related goodwill-based trust to the affective dimensions (see figure 2.2). They also noted that, in service relationships the influence of the cognitive dimension is stronger than the affective trust, and proved it in an empirical study on the role of cognitive and affective trust in financial service relationships. (Johnson and Grayson, 2005).

While there was a clear theoretical explanation and empirical evidence to explain why system-based and process-based trust is more influential than goodwill-based trust, there was neither a direct explanation in the literature nor any empirical research to explain why the system-based trust is more influential than process-based trust.

Nevertheless, a reasonable explanation was drawn from an empirical research that found that the effect of trust on perceived quality is mediated through the perceived risk. In their research on the municipal water quality in Sweden, Bratanova, Morrison, et al. (2013) found that trust in the water supply authorities was found to directly predict consumers' perception of risk associated with water use, which in turn predicted their evaluation of the water quality. A similar finding was documented in a study in food retailing industry (Viktoria Rampl, Eberhardt, et al., 2012).
Based on this understanding of the link between trust-perceived risk-perceived quality, and by looking at the three elements of trust from the perspective of risk, it could be suggested that

water users regarded the efficiency of the regulatory agencies in monitoring Miyahuna's performance and ensuring the quality of water as more assuring in minimizing the risk than relying on competency of Miyahuna in service delivery and water treatment. Which in turn explains why system-based trust was more influential than process-based trust.

This finding can be further supported by earlier studies about the importance of a regulatory system in the food industry which drinking water can be considered part of. Food regulations, standards and surveillance were regarded as one of the most important strategies in rebuilding customers' trust in the food system in Australia (Wilson, Withall, et al., 2016). Another study in the food system in Taiwan found that consumers regarded food quality monitoring organizations as the most important actors amongst all the institutions involved in the food supply (Chen, 2008).

5.1.4 The extent of the combined influence of the three elements of trust on perceived quality

In the previous section, the influence of each element of trust on perceived quality was explained individually, in this section the combined influence of those elements on perceived quality will be clarified.

The results indicated that the combined influence of the three elements of trust on perceived quality does not equal the sum of each element's influence. That is due to the fact that those three elements are highly correlated (Johnson and Grayson, 2000) which means that their influence will overlap (Sapsford and Jupp, 2006).

The results showed strong positive correlation between system-based, process-based, and goodwill-based trust with the strongest correlation being between the first two. Customers who had more confidence in the regulatory agencies' efficiency in enforcing water quality standards had more confidence in Miyahuna's competency in service delivery and water treatment. That is logical, since compliance to the standards is an indication of competence in service delivery. Likewise, Miyahuna's high competency could be in indication of an efficient regulatory agency.

5.2 Conclusion

The findings of this research support the water sector views about trust and the public perception of water quality. It showed that the perceived quality of public water is significantly influenced by the level of public trust in water related institutions. People who had higher levels of trust had more positive perception of the water quality. People build this trust on the service provider's competency, and how much capable they consider is the service provider to deliver good quality water. They also build their trust on the guards of the regulatory system that is governing the water quality, and how efficient they regard the responsible agencies in monitoring and enforcing the quality standards. Finally, they build their trust on the service provider's integrity and how committed they belief it is to the moral obligation of delivering safe and good quality water.

The results showed that perceived quality of water is significantly influenced by all of the above mentioned elements. Nevertheless, people's opinion of the regulatory system was found to be the most influential element. But on the other hand, the results showed that all the above mentioned elements are highly inter-related and mutually reinforcing. Therefore, the importance of one element should not undermine the importance of the others.

5.3 Recommendations for policy makers

The objective of this research was to identify the most influential element of trust on perceived quality to help the water sector in developing targeted strategies to improve the public perception of water quality. Based on the findings of this research, policy makers have to focus on improving the public trust in the regulatory system governing water quality since it is the most influential element of trust as demonstrated by the results of this research.

In the course of the survey, it was found out that the vast majority of the respondents indicated that it is necessary to have an agency monitoring Miyauna's compliance to drinking water quality standards. On the hand the survey showed that 70% of the customers were not aware of the existence of specific monitoring or regulatory system for water quality which due to the lack of information and communication on the role of the regulatory system in the water service delivery. Therefore, it is recommended that authorities carry out public awareness campaigns on the role of WAJ and MOH in testing and monitoring water quality to establish system-based trust for public water consumers.

In addition to that, the existing levels of customers trust in regulatory system can be improved by targeting the compliance enforcement aspect which the customers had least favourable opinions about. It was mentioned earlier that customers were sceptical about the efficiency of WAJ and MOH in enforcing Miyahuna's compliance to the water standards and of the action they take in case violating those standards. Those are legitimate concerns given the current legislative and institutional structure which does not grant those institutions the power to apply sanctions on Miyahuna.

5.4 Recommendations for future research

This research dealt with very complex constructs; trust and perception. The research strategy chosen although allowed a broad understanding of public opinions lacked the depth needed to fully understand the relationship between the concepts in question. The use of questionnaires adds some limitations of the validity of the data. No matter how carefully designed is the questionnaire it cannot encompass all possible answer for all situations. Although the questionnaire was pre-tested, modified and tested again, the final survey results showed that a high percentage (approximately 30%) of the responses were "neutral" across all questions. This indicates a high probability that the respondents didn't understand the question. It is for these two considerations a qualitative research or a case study might be beneficial. This research can from a good base for such a research.

The results of this research has to be taken with caution as the researcher has a concern related to the knowledge assessment method used to distinguish between those respondents who knew about the regulatory system and those who didn't. As detailed in chapter (4) section (4.3.3) the respondents were asked "do you know if there is a particular agency monitoring Miyahuna's water quality?" this question does not fully capture the whole of a regulatory system. Due to the limitations of the questionnaire, the researchers could not ask about the respondents' knowledge of water quality standards, or relevant laws or legislations that are part of the regulatory system. In addition to that, the respondents were required to mention the name of agency, it is possible that some respondents who knew there is an agency did not know its name particularly or they forgot it, thus got eliminated from the count. Those factors may have affected the measurement of system-based trust and the data analysis and research findings accordingly.

Finally, the reader should be reminded of the limitation imposed on the external validity of this research by the sampling procedure that used to select the participants in this survey. As

mentioned earlier, due to time and resources limitation the researcher was limited to using convenience sampling which is known to undermine the representativeness of the selected sample, accordingly undermining the ability to generalize the research results. Therefore, it is recommended that further researches take this point into consideration.

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Annex 1: data collection instrument (questionnaire)

Hello,

I'm a student currently conducting a research on Amman residents' opinion of their water utility (Miyahuna) and its services. I would appreciate your cooperation to fill up this short questionnaire to help me complete my research. Please note that the data you will provide will only be used for academic purposes.

I would like to know your opinion of the water utility (Miyahuna). Please circle the number that expresses the degree of your agreement to the following statements. Please keep in mind that the main purpose of the following questions is to know **your personal opinion not to test your knowledge in technical matters.**

		Strongly disagree	disagree	neutral	agree	Strongly agree
1	I'm confident that Miyahuna has the skills and experience needed to deliver its services.	1	2	3	4	5
2	I'm confident that Miyahuna has the skills and experience needed for water treatment.	1	2	3	4	5
3	I feel that confident that Miyahuna can be depended on to deliver the service in a consistent manner.	1	2	3	4	5
4	In my dealings with the Miyahuna I feel confident that they will accomplish what they say they will do.	1	2	3	4	5
5	In my dealings with Miyahuna I believe that I'm being treated justly and fairly	1	2	3	4	5
6	I believe that Miyahuna deals with me with integrity (I don't believe Miyahuna is opportunistic)	1	2	3	4	5
7	In my dealings with Miyahuna I believe that I'm being treated justly and fairly	1	2	3	4	5

Now, let's focus on the issue of drinking water quality,,,

		Strongly disagree	disagree	neutral	agree	Strongly agree
7	I think it is necessary to have an agency monitoring Miyahuna closely to ensure the quality of water.	1	2	3	4	5

8. are you aware of any agency that monitors Miyahuna's water quality?

□ No □ Yes, if you answer yes please name this agency ……..

The next section (9 to 12) is related to the monitoring agency you named above. If you answered with (No) please skip those questions

		Strongly disagree	disagree	neutral	agree	Strongly agree
9	I believe that this agency is monitoring the water quality on regular basis.	1	2	3	4	5
10	I believe that this agency will take the right measures against Miyahuna in case they did not comply with water quality standards.	1	2	3	4	5
11	Having this agency makes me comfortable that water quality is good	1	2	3	4	5
12	I trust this agency's integrity	1	2	3	4	5

Now I want to know your opinion about the quality of the water Miyahuna is providing (tap water).

		Very bad	bad	neutral	good	Very good
13	What's your evaluation of water color	1	2	3	4	5
14	What's your evaluation of water odor	1	2	3	4	5
15	What's your evaluation of water taste	1	2	3	4	5

The color, odor and taste are quality aspects of water that we can evaluate with our senses. however, there are other important quality aspects that often we cannot evaluate with our senses but we hold beliefs or assumptions about based on what we read or hear in our daily lives. In the following questions I would like to know your impression of those quality aspects. Please circle the number that expresses the degree of your agreement to the following statements.

		Strongly disagree	disagree	neutral	agree	Strongly agree
16	I think that tap water might contain germs, microbes or bacteria	1	2	3	4	5
17	I think that tap water might contain harmful chemicals	1	2	3	4	5
18	I think that tap water might contain radioactive matter	1	2	3	4	5

Finally, I need some information about you that will help me analyze my data

19	What is the main source of drinking water in your household?				
	□ tap water		□ In home filtered tap water		
	□ water bought from filtration shops		□ branded bottled water (Nestle, Aquafina,etc)		
20	Area of residence	□ East Amman	□ West Amman		
21	Gender	□ female	□ male		
22	Age	□ less than 20 yrs	□ 20-40 yrs	□ 41-60 yrs	□ above 60 yrs
23	Education level	□ less than high school	□ high school	□ bachelor/ diploma	□ post graduate

Thank you for time and cooperation

مرحبا،

أنا طالبة ماجستير أقوم بدراسة مستوى خدمات شركة مياهنا في مدينة عمان، و جزء مهم جدا من دراستي يتعلق برأي مواطني مدينة عمان بشركة مياهنا . سوف أكون شاكرة جدا لكم بمساعدتي لاستكمال دراستي من خلال تعبئة هذا الاستبيان و الذي لن يستغرق من وقتكم أكثر من 10 دقائق علما بأن المعلومات التي ستقدمونها هي لأغراض البحث العلمي فقط .

و شكرا جزيلا لكم لتعاونكم معي في هذا البحث.

أود معرفة رأيك في شركة مياهنا من خلال موافقتك او عدم موافقتك على العبارات التالية، الرجاء وضع دائرة حول الرقم الذي يعبر عن درجة موافقتك . ملاحظة هامة: اود التنويه ان الغرض الرئيسي من اجاباتك على الاسئلة التالية هي معرفة **رأيك و انطباعك الشخصي** كمواطن يتلقى خدمة المياه من هذه الشركة حتى ولو شعرت ان بعض الاسئلة تحتاج الى دراية و معرفة ببعض الامور الفنية .

		لا اوافق بشدة	لا اوافق	محايد	اوافق	اوافق بشدة
1	انا اعتقد أن شركة مياهنا لديها الكفاءة و الخبرة المطلوبة من أي شركة مياه موثوقة	1	2	3	4	5
2	انا اعتقد ان شركة مياهنا يمكن الاعتماد عليها لتقديم خدمة جيدة بشكل مستمر	1	2	3	4	5
3	في تعاملي مع شركة مياهنا أكون واثقا انها ستنفذ ما تعد به	1	2	3	4	5
4	انا اثق ان شركة مياهنا عندها الكفاءة (موظفين ، أجهزة) في تنقية المياه حسب المقاييس المطلوبة من اي شركة مياه موثوقة.	1	2	3	4	5
5	في تعاملي مع شركة مياهنا أكون واثقا من انني اتلقى نفس المعاملة التي يتلاقاها غيري من الناس من غير تمييز	1	2	3	4	5
6	في تعاملي مع شركة مياهنا أكون واثقا أن جميع الاجراءات التي تتخذها هي لمصلحتي و مصلحة الناس (لا اشك انها استغلالية)	1	2	3	4	5
7	اعتقد ان شركة مياهنا صريحة و واضحة في تعاملها معي ومع الناس	1	2	3	4	5

و الآن أود أن أسألك بعض الاسئلة بخصوص نوعية مياه الشرب التي تزودها مياهنا ،،،،،

		لا اوافق بشدة	لا اوافق	محايد	اوافق	اوافق بشدة
8	انا اعتقد انه من الضروري وجود جهة رقابية على مياهنا لضمان نوعية مياه الشرب التي تقوم بتزويدها	1	2	3	4	5

9 هل تعلم أن هناك جهة رقابية تقوم بمراقبة نوعية المياه التي تزودها مياهنا للمواطنين؟

□1 لا □2 نعم (الرجاء ذكر اسم هذه الجهة الرقابية) .....

اذا اجبت ب (لا) الرجاء **عدم** الاجابة على (11 ألى 14)

		لا اوافق بشدة	لا اوافق	محايد	اوافق	اوافق بشدة
10	انا اعتقد انه هذه الجهة الرقابية تقوم بمراقبة نوعية المياه بشكل دائم.	1	2	3	4	5
11	انا اعتقد انه هذه الجهة الرقابية تقوم باتخاذ اجراءات جزائية بحق مياهنا في حال اخلالها بنوعية مياه الشرب التي تقوم بتزويدها	1	2	3	4	5
12	بوجود هذه الجهة الرقابية اكون مطمئنا من نوعية المياه التي تصلني في منزلي	1	2	3	4	5
13	أنا أثق بمصداقية هذه الجهة الرقابية	1	2	3	4	5

و الآن أود معرفة تقييمك لنوعية مياه الشرب التي تزودها مياهنا (مياه الحنفية) ،،،

الرجاء وضع دائرة حول الرقم الذي يعبر عن تقييمك.

		سيء جدا	سيء	محايد	جيد	جيد جدا
14	ما تقييمك للون المياه	1	2	3	4	5
15	ما تقييمك لرائحة المياه	1	2	3	4	5
16	ما تقييمك لطعم المياه	1	2	3	4	5

إن اللون، الرائحة و الطعم هي خصائص نستطيع أن نقيمها بحواسنا و لكن هناك خصائص أخرى للمياه مهمة مثل خلوها من الجراثيم او المواد الكيماوية ، الخ. غالبا لا نستطيع تقييم هذه الخصائص من خلال حواسنا الا اننا نكون عنها اعتقادات أو ظنون من خلال ما نقرأ أو نسمع في حياتنا اليومية. في الاسئلة التالية أود معرفة **انطباعك** عن الخصائص. الرجاء وضع دائرة حول الرقم الذي يعبر عن درجة موافقتك على العبارات التالية.

		لا اوافق بشدة	لا اوافق	محايد	اوافق	اوافق بشدة
17	انا اظن أن المياه تحتوي احيانا على جراثيم، ميكروبات أو بكتيريا	1	2	3	4	5
18	انا اظن أن المياه تحتوي احيانا على كيماويات مضرة	1	2	3	4	5
19	انا اظن أن المياه تحتوي احيانا على مواد مشعة	1	2	3	4	5

و أخيرا ، بعض المعلومات عنك و التي احتاجها لغايات فرز البيانات.

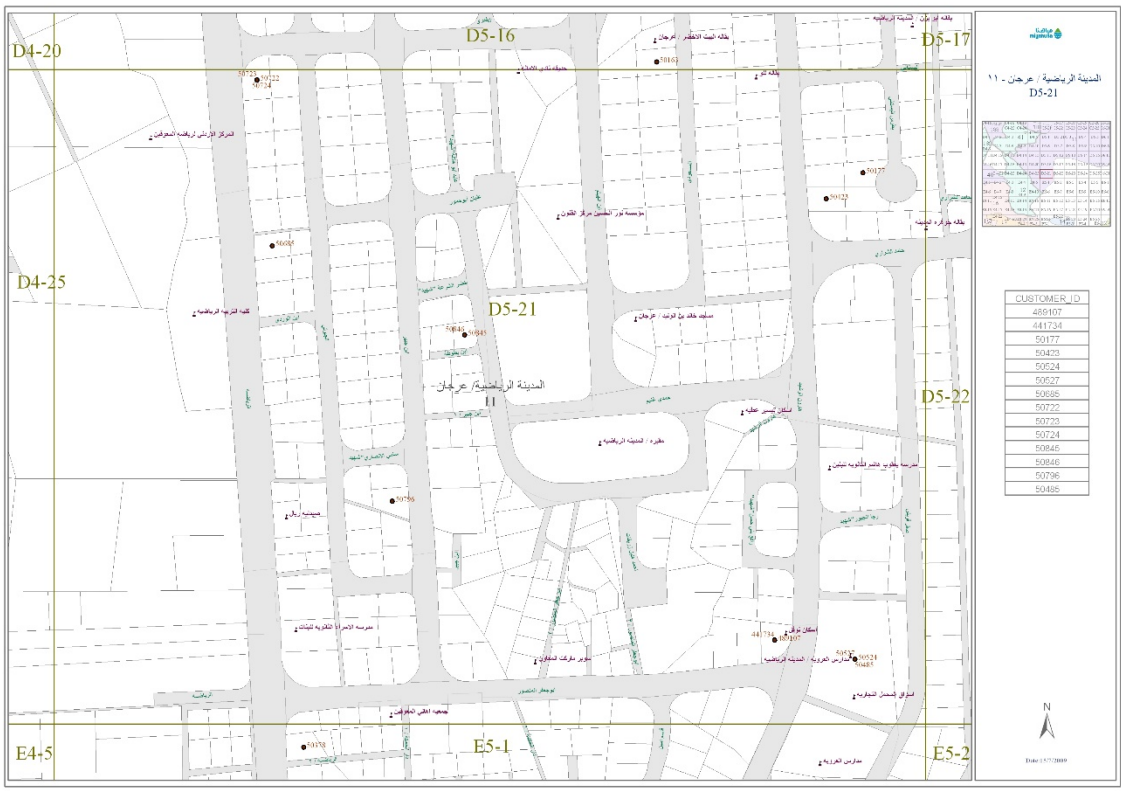
20	ماذا تستخدم بشكل رئيسي لأغراض الشرب في منزلك ؟ (الرجاء وضح دائرة حول الاجابة الصحيحة)	
	□1 مياه الحنفية (دون فلترة)	□2 مياه الحنفية (مفلترة بالمنزل)
	□3 عبوات المياه الفلترة (محلات الفلترة)	□4 عبوات المياه المعدنية (مثل أكوافينا، نستلة، ألترا، الخ)

21	أين تسكن؟	□1 شرق عمان	□2 غرب عمان	□3 شمال عمان	□4 جنوب عمان
22	مقيم في عمان منذ؟	□1 أقل من 5 سنين	□2 من 5 الى 10	□3 أكثر من 10	
23	الجنس	□1 أنثى	□2 ذكر		
24	العمر	□1 أقل من 20	□2 من 20-40	□3 من 41-60	□4 أكثر من 60
25	التحصيل العلمي	□1 أقل من توجيهي	□2 توجيهي	□3 دبلوم/بكالوريوس	□4 أكثر من ذلك

شكر جزيلا لوقتكم و تعاونكم

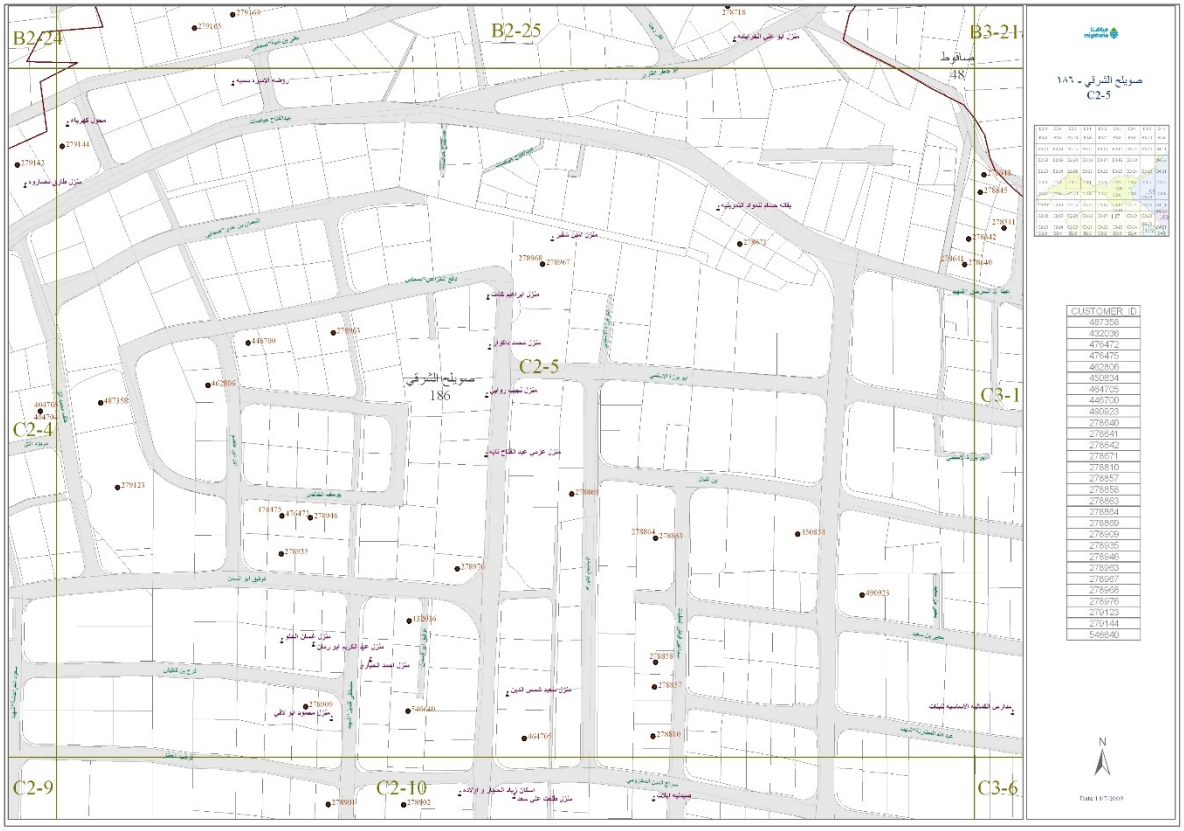
Annex 2: Maps and pictures of the surveyed neighbourhoods

Annex 2 Figure 1: Map of Arjan (lower income area). Source: Miyahuna



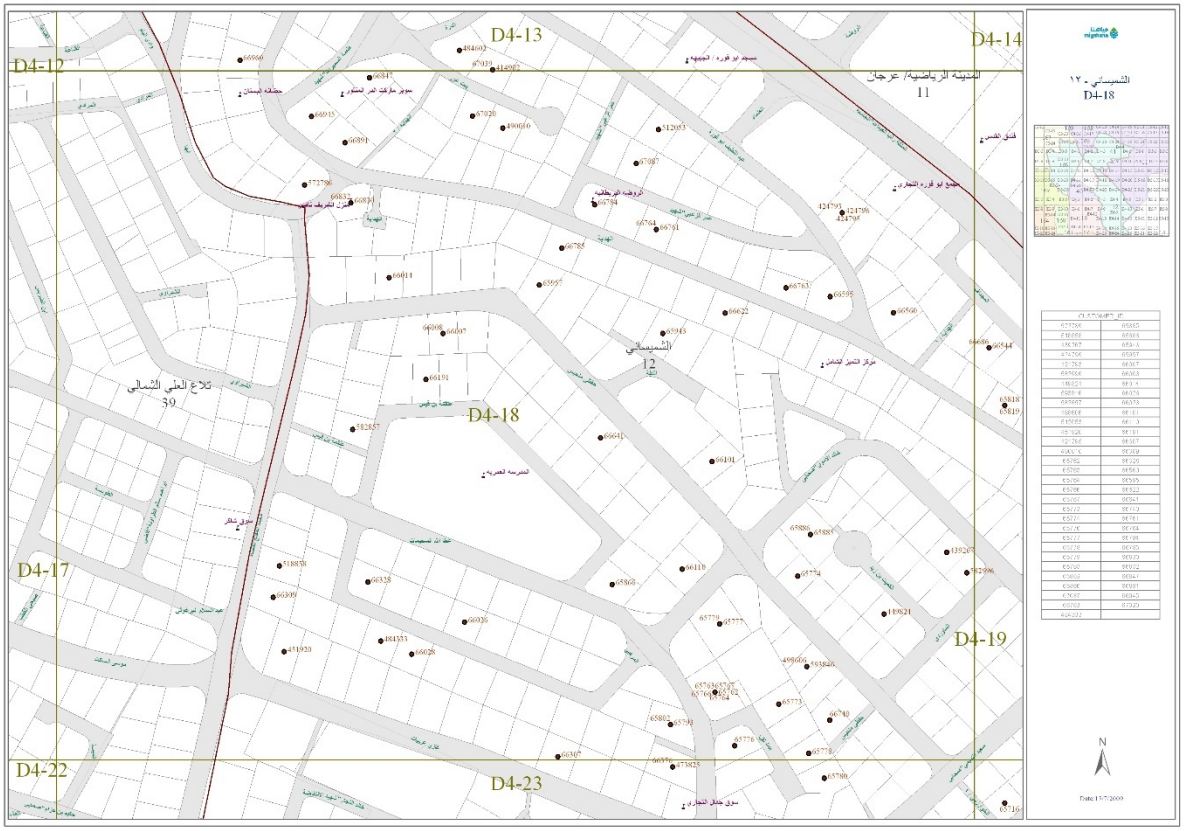
Annex 2 Picture 1: one of the houses surveyed in Arjan (lower income area). Source: Author

Annex 2 Figure 2: Map of Sweileh (lower income area). Source: Miyahuna



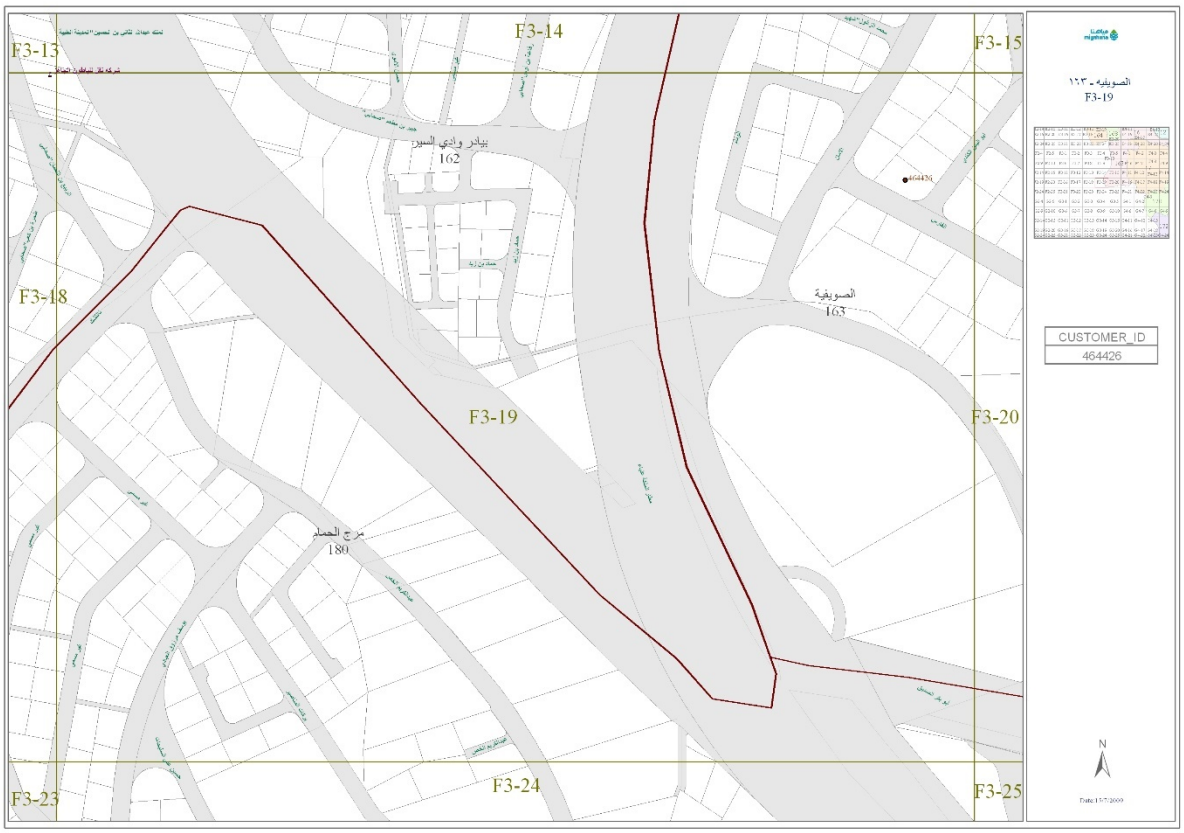
Annex 2 Picture 2: one of the streets surveyed in Sweileh (lower income area). Source: Author

Annex 2 Figure 3: Map of Shimesani (higher income area). Source: Miyahuna



Annex 2 Picture 3: **One of the streets surveyed in Shimesani (higher income area). Source: Author**

Annex 2 Figure 4: Map of Sweifieh (higher income area). Source: Miyahuna



Annex 2 Picture 4: One of the houses surveyed in Sweifieh (higher income area). Source: Author

Annex 2 Picture 5: one of the shopping venues visited for the survey (lower income areas). Source: google.

Annex 2 Picture 6: one of the shopping venues visited for the survey (higher income areas). Source: google.

Annex 3: Pilot version of the questionnaire

Hello,

I'm a student currently conducting a research on Amman residents' opinion of their water utility (Miyahuna) and its services. I would appreciate your cooperation to fill up this short questionnaire to help me complete my research. Please note that the data you will provide will only be used for academic purposes.

I would like to know your opinion of the water utility (Miyahuna). Please circle the number that expresses the degree of your agreement to the following statements.

	statement	Strongly disagree						Strongly agree
1	I'm confident that Miyahuna has the competence and expertise in drinking water treatment	1	2	3	4	5	6	7
2	I'm confident that Miyahuna has the competence and expertise in testing water quality	1	2	3	4	5	6	7
3	I'm confident that Miyahuna has the competence and expertise to control water contaminations if it happened	1	2	3	4	5	6	7
4	I believe that Miyahuna is honest with me and its customers, therefore it will not betray its moral obligation by distributing water of bad quality	1	2	3	4	5	6	7

I would like to know your opinion in the Jordan Water Authority which is the drinking water quality regulator.

	Statement	Strongly disagree						Strongly agree
5	I'm confident that the Water Authority is regularly monitoring Miyahuna's compliance to drinking water standards.	1	2	3	4	5	6	7
6	I'm confident that the Water Authority will take action against Miyahuna in case they did not comply with water quality standards.	1	2	3	4	5	6	7

Now I want to know your opinion about the quality of the water Miyahuna is providing (tap water).

	Statement	Strongly disagree						Strongly agree
7	Tap water color is good	1	2	3	4	5	6	7
8	Tap water is clear (not turbid)	1	2	3	4	5	6	7
9	Tap water odor is good	1	2	3	4	5	6	7
10	Tap water taste is good	1	2	3	4	5	6	7
11	Tap water is safe	1	2	3	4	5	6	7

Finally, I need some information about you that will help me analyze my data

12	What is the main source of drinking water in your household?				
	□ tap water		□ In home filtered tap water		
	□ water bought from filtration shops		□ branded bottled water (Nestle, Aquafina,etc)		
13	Area of residence	□ East Amman	□ West Amman		
14	Gender	□ female	□ male		
15	Age	□ less than 20 yrs	□ 20-40 yrs	□ 41-60 yrs	□ above 60 yrs
16	Education level	□ less than high school	□ high school	□ bachelor/ diploma	□ post graduate

Thank you for time and cooperation

Annex 4: Results of statistical tests.

Correlation test – Group B

		process-based trust	goodwill-based trust	system-based trust	perceived quality
process-based trust	Pearson Correlation	1	.592**	.610**	.319*
	Sig. (2-tailed)		0	0	0.016
	N	57	55	56	57
goodwill-based trust	Pearson Correlation	.592**	1	0.241	0.243
	Sig. (2-tailed)	0		0.069	0.062
	N	55	60	58	60
system-based trust	Pearson Correlation	.610**	0.241	1	.518**
	Sig. (2-tailed)	0	0.069		0
	N	56	58	59	59
perceived quality	Pearson Correlation	.319*	0.243	.518**	1
	Sig. (2-tailed)	0.016	0.062	0	
	N	57	60	59	62

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Simple regression analysis: process-based trust & perceived quality – Group B

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.319[a]	.102	.085	.5857

a. Predictors: (Constant), process-based trust

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.132	1	2.132	6.215	.016[b]
	Residual	18.869	55	.343		
	Total	21.001	56			

a. Dependent Variable: perceived_quality. b. Predictors: (Constant), process-based trust

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.433	.406		5.990	.000
	process trust	.279	.112	.319	2.493	.016

a. Dependent Variable: perceived_quality

Simple regression analysis: goodwill-based trust & perceived quality – Group B

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.243[a]	.059	.043	.5985

a. Predictors: (Constant), goodwill_trust

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.302	1	1.302	3.634	.062[b]
	Residual	20.777	58	.358		
	Total	22.079	59			

a. Dependent Variable: perceived_quality

b. Predictors: (Constant), goodwill_trust

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.851	.303		9.423	.000
	goodwill_trust	.175	.092	.243	1.906	.062

a. Dependent Variable: perceived_quality

Simple regression analysis: system-based trust & perceived quality – Group B

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.518[a]	.268	.255	.5159

a. Predictors: (Constant), system_trust_

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.557	1	5.557	20.880	.000[b]
	Residual	15.171	57	.266		
	Total	20.729	58			

a. Dependent Variable: perceived_quality Predictors: (Constant), system_trust_

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.603	.406		3.950	.000
	system_trust_	.508	.111	.518	4.569	.000

a. Dependent Variable: perceived_quality

Correlation test – Group C

		process_ trust	Goodwill _trust	perceived_ quality
process_trust	Pearson Correlation	1	.721**	.456**
	Sig. (2-tailed)		.000	.000
	N	56	56	56
goodwill_trust	Pearson Correlation	.721**	1	.409**
	Sig. (2-tailed)	.000		.001
	N	56	62	62
perceived_quality	Pearson Correlation	.456**	.409**	1
	Sig. (2-tailed)	.000	.001	
	N	56	62	62

**. Correlation is significant at the 0.01 level (2-tailed).

Simple regression analysis: process-based trust & perceived quality – Group C

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.456[a]	.208	.193	.5729

a. Predictors: (Constant), process_trust

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.651	1	4.651	14.172	.000[b]
	Residual	17.722	54	.328		
	Total	22.373	55			

a. Dependent Variable: perceived_quality

b. Predictors: (Constant), process_trust

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.945	.408		4.769	.000
	Process trust	.445	.118	.456	3.765	.000

a. Dependent Variable: perceived_quality

Simple regression analysis: goodwill-based trust & perceived quality – Group C

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.409[a]	.167	.153	.5778

a. Predictors: (Constant), goodwill_trust

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.018	1	4.018	12.038	.001[b]
	Residual	20.028	60	.334		
	Total	24.047	61			

a. Dependent Variable: perceived_quality

b. Predictors: (Constant), goodwill_trust

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.487	.292		8.516	.000
	goodwill_trust	.299	.086	.409	3.470	.001

a. Dependent Variable: perceived_quality

Annex 5: IHS copyright form

In order to allow the IHS Research Committee to select and publish the best UMD theses, participants need to sign and hand in this copy right form to the course bureau together with their final thesis.

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