DOI: 10.24850/j-tyca-2024-05-07

Notes

Reasons for bottled water consumption in Mexico and consumer perceptions

Motivos del consumo de agua embotellada en México y las percepciones del consumidor

Jorge Silva[1], ORCID: https://orcid.org/0000-0002-0961-4696

[1]Instituto Politécnico Nacional, Escuela Superior de Comercio y Administración, Unidad Santo Tomás, Mexico City, Mexico, j.a.silva@outlook.com

Corresponding author: Jorge Silva, j.a.silva@outlook.com

Abstract

The main objective of this research paper is to analyses the reasons for bottled water consumption in Mexico and consumer perceptions. It was conducted a systematic literature review using the Preferred Reporting Item for Systematic Reviews (PRISMA) and the STROBE Checklist. The study design was chosen because it involves the utilization of explicit and reproducible methods for searching, appraising and synthesizing information on the topic. Electronic searches were conducted via Web of Science and Scopus, with articles published between 1987 and 2022 being

identified. The articles were then screened for relevance, applicability, validity, and reliability. The data extraction process involved the use of the Systematic Review Data Repository (SRDR). The tool is web-based and seminal in the extraction and management of data for systematic review. A total of 26 articles were identified which offered a historical review of bottled water consumption in Mexico. The articles cite that the spike in demand for bottled water is caused by organoleptic and health perceptions among the customers. The perceptions are traced back to the 1985 earthquake and cholera outbreak in 1991, which caused water scarcity and contamination issues. The research is novel, with a review of the articles showing there is an apparent dearth of knowledge with regards to the main reason why Mexico is the number one consumer of bottled water. The information presented is seminal in helping public administrators improve water supply service quality and customer satisfaction rates.

Keywords: Bottled water, consumer expectations, drinking water, per capita consumption, satisfaction, tap water.

Resumen

El presente trabajo de investigación tiene como objetivo principal analizar los motivos del consumo de agua embotellada en México y las percepciones del consumidor. Se realizó una revisión sistemática de la literatura utilizando el elemento de informe preferido para revisiones sistemáticas (PRISMA) y la lista de verificación STROBE. El diseño del estudio fue elegido porque involucra el empleo de métodos explícitos y reproducibles para buscar, evaluar y sintetizar información sobre el tema.

Se llevaron a cabo búsquedas electrónicas a través de Web of Science y Scopus, identificándose artículos publicados entre 1987 y 2022. Luego, los artículos se seleccionaron por relevancia, aplicabilidad, validez y confiabilidad. El proceso de extracción de datos involucró el uso del Repositorio de Datos de Revisión Sistemática (SRDR). La herramienta está basada en la Web, y es fundamental en la extracción y gestión de datos para la revisión sistemática. Se identificaron 26 artículos que ofrecían una revisión histórica del consumo de agua embotellada en México. Los artículos citan que el aumento en la demanda de agua embotellada se debe a las percepciones organolépticas y de salud entre los clientes. Las percepciones se remontan al terremoto de 1985 y al brote de cólera de 1991, que provocó escasez de agua y problemas de contaminación. La investigación es novedosa, con una revisión de los artículos que muestra que existe una aparente escasez de conocimiento con respecto a la razón principal por la que México es el consumidor número uno de agua embotellada. La información presentada es fundamental para ayudar a los administradores públicos a mejorar la calidad del servicio de suministro de agua y los índices de satisfacción del cliente.

Palabras clave: agua embotellada, expectativas del consumidor, agua potable, consumo per cápita, satisfacción, agua del grifo.

Received: 22/08/2022

Accepted: 27/03/2023

Published Online: 28/03/2023

Introduction

The quality of drinking water in Mexico has in recent years been the subject of disputatious debates, with scholars and practitioners alike agreeing that the supply system is marred by a myriad of issues. The water supply system in Mexico falls short of the Sustainable Development Goal target 6.1, which emphasizes the need to ensure that every denizen has universal and equitable access to safe and affordable drinking water (WHO, 2022a; WHO, 2012). Statistical data presented by United Nations (UN, 2022) shows that at least 43 % of the population in Mexico use a safely managed drinking water service which leaves 57 % facing accessibility issues. Furthermore, the service quality levels of the water supply system differ in the national, urban and rural areas (UN, 2022). For instance, 40 % of people in the national frontier derive drinking water from safely managed services, while another 60 % rely on basic services (UN, 2022). In the urban areas, 100 % of the population is served by basic water supply systems which barely meet their needs (Silva-Rodríguez-de-San- Miguel, 2018; UN, 2022). The rural areas are compounded by accessibility issues to safe drinking water, with 90 % using basic services while another 10 % utilizing surface water (UNODC, 2021).

The lack of iron-clad water supply services has harnessed a perception of below-par service quality. As a matter of fact, people in Mexico rarely drink tap water since it is polluted by compounds that, in turn, cause health care issues. The gap in access to safe drinking water has created a viable opportunity for the growth in demand for bottled

Tecnología y ciencias del agua, ISSN 2007-2422, 15(5), 335-368. DOI: 10.24850/j-tyca-2024-05-07

water. Espinosa-García *et al*. (2015) highlight that the surge in demand is commingled with beliefs that bottled water is healthier and safer compared to tap water. Furthermore, most Mexicans believe that bottled water contains the requisite organoleptic properties that improve their quality of life and overall health (Espinosa-García *et al*., 2015; Delpla, Legay, Proulx, & Rodriguez, 2020; Da-Silva-Costa *et al*., 2021).

An in-depth review of the statistical data reveals that Mexico is one of the top countries in per capita bottled water consumption. Espinosa-García *et al*. (2015) cite that the nation consumes up to 5 billion liters of water on an annual basis. Mexico News Daily (2019) builds upon this disposition by citing that 9 out of every 10 Mexicans regularly consume bottled water which is more than four times the per capita level of consumption in the United States of America. The increased water consumption has necessitated the entry of renowned bottled companies like Pepsi, Coca-Cola and Danone into the market. Webber (2013) cites that Mexico is the world's biggest market for bottled water which is a commodity that most western countries take for granted. The average Mexican spends up to 173 pesos ($9) on drinking water which is quite high considering the fact that most people are below the poverty line (WBG, 2015; Webber, 2013; Mexico News Daily, 2019; Transparencia Presupuestaria, 2021). The minimum wage in 2022 was 172.87 pesos daily and in the Northern Border Free Zone it was 260.34 pesos daily (Comisión Nacional de los Salarios Mínimos, 2021), thereby meaning that not everybody can afford to buy bottled water. In light of this, it goes without saying that poor families are paying more for bottled water while rich families spend less on drinking water (Expat Insurance, 2022; Biswas

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& Uitto, 1999; Yaniz, 2016). This, in turn, creates market asymmetry and inequality, which has grown significantly over the past three decades.

The main purpose of this research is to analyse the reasons for bottled water consumption in Mexico and consumer perceptions. The paper is written from a public administration perspective with the aim of understanding why most Mexicans prefer bottled water over tap water. A systematic review is conducted in various works of erudition, with the themes being divided substantially. Furthermore, the content is distributed into four succeeding components, including the methodology, results, discussion (findings and gaps) and conclusions. The results derived from the research are substantial in improving knowledge on how the quality of drinking water in Mexico can be improved in order to attain the aforementioned Sustainable Development Goal 6.

Methodology

The proposed study is novel by nature, ergo it requires a comprehensive analysis of key gaps in research on the topic of bottled water consumption in Mexico. For this purpose, a systematic review methodology was chosen, which involved the utilization of explicit and reproducible methods for searching, appraising and synthesizing information on the topic (Lawati, Dennis, Short, & Abdulhadi, 2018; Mokssit, Gouvello, Chazerain, Figuères, & Tassin, 2018). The methodology was deemed effective because it delivers a clear and comprehensive analysis of available evidence. Furthermore, it helped the research highlight methodological concerns in previous works of erudition, ergo providing a foundation on

how future work in the topic area can be improved (The University of North Carolina, 2022).

The systematic review methodology was defined according to the Preferred Reporting Item for Systematic Reviews (PRISMA) statement. The statement is substantial as it breaks down the literature identification process into a select number of steps, as shown below.

Research question

The burgeoning research question guiding the systematic review is "how is bottled water consumption in Mexico and consumer perceptions?". This research question was substantial in redefining the scope of review and ensuring that the requisite data sources were identified and critically appraised.

Search strategy

The identification of the relevant studies was conducted by searching through Web of Science and Scopus databases between June 30th and July 2nd 2022. There were keyed in free-text words including "bottled water", "per capita consumption", "Mexico", "organoleptic characteristics", "service quality", and "tap water". It was ensured that there was a mixture of the subject terms and keywords in order to expand the number of literature articles identified. Furthermore, truncation and adjacency searching was used. The truncation strategy involved the keying in of words like "drinking water quality*" and "bottled water*" into

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the databases (Schmidt *et al*., 2020). The adjacency searching, on the other hand, involved searching for the articles using a phrase such as "bottled water per capita consumption", "perceptions of drinking water in Mexico", and "organoleptic and health factors influencing drinking water consumption in Mexico." To improve the search process, it was utilized a snowball sampling method which identified any papers that did not directly answer the research question. The method was seminal in ensuring that the number of articles identified could help to improve knowledge regarding the topic.

Eligibility criteria and selection process

There were individually evaluated and screened the articles using inclusion and exclusion criteria. The inclusion criteria defined the articles based on their information regarding bottled water in Mexico. Furthermore, the year of publication was substantial in the selection process, with articles written between 1987 and 2022 being included.

Additionally, the inclusion criteria explored whether the articles were in English with the aim of reducing the time spent translating articles. It is imperative to note that translating foreign articles can also lead to a dip in the quality of the information provided, which inadvertently undermines effective analysis. The exclusion criteria, on the other hand, focused on articles which focused on water and sanitation topics. Furthermore, articles that did not directly mention the concept of bottled water were not included in the selection process.

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The pertinent articles were extracted from the database with two reviewers helping determine whether they satisfied the inclusion criteria. In the event that there were disagreements on a specific article, then it was tasked with judging whether it could be included or not. The PRISMA statement was also complemented by the STROBE guidelines during the selection process.

The STROBE guidelines were chosen because they helped in charting the data/ articles and ensuring that they conform to the predefined inclusion criteria. Despite having 22 checklist items, only a few were chosen. The first was the title and abstract, with the work evaluating the article to determine if the author indicated the study's design and provided an informative/ balanced summary of the findings (Cuschieri, 2019). The second checklist item was the introduction, with viable articles being chosen for their ability to explain the background and rationale for the investigation. Furthermore, the articles had to explicitly state the specific objectives and aims of the research.

The third checklist item was the methods used in the data collection process. Considering this is a novel systematic review, it was deemed it fit to go for articles which utilized either qualitative or quantitative methodologies. Previous systematic reviews and meta-analyses were not included as it was wanted to determine the key gaps in knowledge from their own analysis (Cuschieri, 2019). Furthermore, the variables used for quantitative studies were reviewed to determine whether the authors explained their application, clearly defined all outcomes.

The fourth checklist item focused on the results, with the review of articles based on whether the information is relevant and if it could

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translate estimates of relative risk/benefits into absolute risks/benefits. The final checklist item explored the discussion section of the articles, whereby the key results were summarized and gauged based on if they were aligned with the study objectives. Articles which did not identify the objectives and research aims were excluded from the final tally. Furthermore, there were evaluated the articles on whether the researchers discussed the study limitations while taking into account key causal factors behind bias or imprecision. On top of this, the interpretation of the results was analyzed while evaluating if they were generalizable.

Data extraction

The data extraction process involved the use of the Systematic Review Data Repository (SRDR). The tool is web-based and seminal in the extraction and management of data for systematic review. It was created a form on the tool, which was then transferred into the document, as shown in the next section (Schmidt *et al*., 2020; Wayant, Page, & Vassar, 2019). During the extraction process, there were trained the external reviewers on the key inclusion categories and the type of data expected.

Thereafter, a pilot activity was conducted to ensure that the data extractors were recording similar data. The extraction form was then revised as necessary, with discrepancies in the data collection process being discussed. It was reserved the right to determine which disputed articles could be included or not which depended on the relevance of them for the theme developed in this research. The final step involved

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documenting and charting the data while keeping track of the decisions made regarding the included articles.

Charting the data

Following the extraction using SRDR, a preliminary data charting table was created, which distinguishes the articles/literature based on the title, type, authors and key findings.

Results

The implementation of the PRISMA technique and the STROBE checklist helped in the identification of a grand total of 100 papers which were then reviewed using the inclusion and exclusion criteria. 40 of the articles were found to be inconclusive with regard to the topic of drinking water in Mexico; ergo, they were excluded. The remaining 60 articles were then reviewed based on whether they define the proclivity and demand for bottled water in Mexico by the customers. Another 34 articles were removed, with the final tally including 26 articles as shown in Table 1. The findings from the articles are analyzed conclusively in the subsequent section, with the necessary gaps being identified.

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Table 1. Articles identified from the systematic review.

Title	Type of document	Authors	Comments on Main Findings
The macro social level of communication science	Book	McLeod and Blumler (1987)	The book explores how big companies utilize advertising and marketing strategies to influence customer perception about a product or service
Evaluation of the effects of the 1985 Michoacan earthquake on the water systems in Metropolitan Mexico	Journal article	Ayala, O'Rourke and Escobar (1990)	The paper explores the negative impact of the 1985 earthquake on the drinking water supply system in Mexico, which contributed to an influx in demand for bottled water
Mexico City's water supply: Improving the outlook for sustainability	Government report	The Joint Academies Committee on the Mexico City Water Supply, Commission on Geosciences, Environment and Resources, National Research Council, Academia Nacional de la Investigación Científica, A.C., and Academia Nacional de Ingeniería, A. C. (1995)	The report focuses on the issues and gaps prevalent in the drinking water supply system and how this contributed to the demand for bottled water
Impulsa cólera agua embotellada (Bottled water boosts cholera)	Article	Zapata (2000)	The article evaluates how the people of Mexico were forced to start buying bottled water due to the risk of cholera in the conventional drinking water supply system

Title	Type of document	Authors	Comments on Main Findings
Fluoride concentration of bottled water, tap water, and fluoridated salt from two communities in Mexico	Journal article	Martínez-Mier, Soto-Rojas, Buckley, Zero, and Margineda (2005)	The journal article shows that tap water contained higher levels of fluoride compared to bottled water which contributes to decreased confidence and high consumption of the latter as a viable choice
Specific action plan: 2007–2012: Cholera	Government report	Mexico Secretary of Health (2008)	The government report analyses the measures taken by the government to curb the cholera outbreak through effective treatment of drinking water supply systems
A Battle Against the Bottles: Building, Claiming, and Regaining Tap-Water Trustworthiness	Journal article	Parag and Roberts (2009)	The journal article highlights the negative environmental impact of bottled water which is 100 times higher compared to tap water due to transportation, manufacturing and storage concerns
Supply *vs*. demand of agri-industrial meat and fish products: A chicken and egg paradigm?	Journal article	Rivera-Ferre (2009)	The article introduces the consumer-choice theory, which shows that most customers make purchase decisions based on their perceptions about service quality and satisfaction rates

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Title	Type of document	Authors	Comments on Main Findings
Hydrocarbons derived from petroleum in bottled drinking water from Mexico City	Journal article	Vega *et al*. (2011)	The journal article explores the negative impact of bottled water production in Mexico. The findings indicate that some of the drinking water samples contained concentrations of aliphatic hydrocarbons and polycyclic aromatic hydrocarbons, which can negatively affect the health and stature of the consumers
Vibrio cholerae classical biotype strains reveal distinct signatures in Mexico	Journal article	Alam *et al*. (2012)	The journal article evaluates the cholera prevalence rates in Mexico following the outbreak caused by the contamination of tap water
Mexico's water war	Article	Castano (2012)	The article shows that the government nudged the people to shift to consuming bottled water due to the apparent gaps in the existing water supply system
Bottled-water habit keeps tight grip on Mexicans	Article	Malkin (2012)	The article shows that Mexicans exhibit favourable perceptions of bottled drinking water out of fear of the health risks posed by tap water

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Title	Type of document	Authors	Comments on Main Findings
Factors affecting the quality of bottled water	Journal article	Diduch, Polkowska and Namieśnik (2013)	The article explores the risk of contaminants seeping into bottled water during the treatment, manufacturing and storage processes
Exploring beliefs about bottled water and intentions to reduce consumption: The dual-effect of social norm activation and persuasive information	Journal article	Linden (2013)	The study alludes that increased consumption of bottled water is correlated with a spike in pollution rates and the risk of contamination
Drinking water quality in a Mexico City University Community: Perception and preferences	Journal article	Espinosa-García *et al*. (2015)	The journal article highlights that most people in Mexico prefer bottled water due to organoleptic and health reasons. Furthermore, the perception of service quality regarding the water supply systems has increased customer dissatisfaction and minimized reliance on tap water for drinking purposes

Title	Type of document	Authors	Comments on Main Findings
Tap *versus* bottled water consumption: The influence of social norms, affect and image on consumer choice	Journal article	Etale, Jobin and Siegrist (2018)	The authors explore the causal factors that drive people to purchase bottled water. The findings show that convenience and safety are contextual predictors which cause an influx in the consumption of bottled drinking water
Bottled water in Mexico: The rise of new access to water paradigm	Journal article	Greene (2018)	The article evaluates how and why bottled water is the main source of drinking water in Mexico. At least three factors are identified, namely the 1985 earthquake, cholera outbreak and market entry by top bottled water companies, which capitalized on an existent gap and customer dissatisfaction
(Re)theorizing the Politics of Bottled Water: Water Insecurity in the Context of Weak Regulatory Regimes	Journal article	Pacheco-Vega (2019)	The article explores the causal factor behind the en masse shift from tap water to bottled water. The author argues that water insecurity has increased the consumption of bottled water in Mexico due to a lack of a rigid water supply system

Title	Type of document	Authors	Comments on Main Findings
Water scarcity and supply challenges in Mexico City's informal settlements	Technical report	Gutierrez (2019)	The technical report explores the water scarcity and supply challenges faced by people in informal settlements in Mexico. The author expatiates that rapid urbanization has contributed to a decline in water availability which in turn causes shifts towards bottled water options which are more expensive
Perception of tap water quality: Assessment of the factors modifying the links between satisfaction and water consumption behavior	Journal article	Delpla *et al*. (2020)	The paper explores the perceptions of tap water and how they inspire a shift towards bottled water due to organoleptic and health reasons
Unsafe waters: The hidrosocial cycle of drinking water in Western Mexico	Journal article	McCulligh, Arellano-García and Casas-Beltrán (2020)	The authors argue that the water supply system in Mexico is undermined by contamination and availability issues. This, in turn, prompts customers to go for alternative sources such as bottled drinking water

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Title	Type of document	Authors	Comments on Main Findings
Water consumption practices in university campuses. The experience of the National Autonomous University of Mexico	Journal article	Arriaga-Medina and Piedra-Miranda (2021)	The journal article highlights that bottled water has gained widespread attention in Mexico due to the below-par quality of tap water. Furthermore, the marketing strategies of large corporations in the market have led to the transfiguration of the value of water from a vital element of life to a commodity correlated with lifestyles and ideas
Potential risk of BPA and phthalates in commercial water bottles: A mini-review	Journal article	Da-Silva-Costa *et al*. (2021)	The article highlights that continuous consumption of bottled water exposes individuals to health risks caused by bisphenol and phthalates
Country overview-Mexico	Technical Report	Sanitation and Water for All (2021)	The technical report explores the challenges facing people in Mexico with regard to drinking water availability
Can you drink the water in Mexico?	Article	Barbezat (2022)	The article highlights that it is preferable to consume bottled water in Mexico because tap water is contaminated from the source

Title	Type of document	Authors	Comments on Main Findings
Cholera	Article	WHO (2022b)	The article provides a background on how cholera is spread through contaminated water sources, ergo explaining the reason why most Mexicans resort to bottled water

Discussion (findings and gaps)

The topic of bottled water is a well-searched and reviewed area, although a good chunk of the information is located in online news articles. There is an apparent dearth of knowledge regarding the causal factors that contributed to the shift towards bottled water consumption which in turn morphed Mexico into the world's largest per capita consumer. Prior to highlighting the causal factors, it is imperative for the reader to gain an insight into the current state of the drinking water supply in Mexico. As per Sanitation and Water for All (2021), drinking water coverage is distributed unequally in Mexico, with urban areas getting more water compared to those in the rural areas. Sanitation and Water for All (2021) shows that a grand total of 89.4 million have access to both standard and basic drinking water, while only 2.6 million urban denizens lack it. Furthermore, there is an 85 % coverage in the rural areas, with 4.1 million out of the 23.3 million people lacking access to safe drinking water. The increased urbanization in Mexican cities has caused water scarcity, with the government resorting to wastewater treatment which is then supplied as drinking water through taps and the pipe system (Gutierrez, 2019;

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Silva-Rodríguez-de-San-Miguel, 2018; Silva-Rodríguez-de-San-Miguel, Lambarry-Vilchis, & Trujillo-Flores, 2019).

The introduction of wastewater treatment systems as a complementary feature to the inherent drinking water system can be traced back to the 20th century. As Mexico shifted from supply-based policies to demand management frameworks, the government argued the importance of having complementary features/structures to improve customer satisfaction (McCulligh & Tetreault, 2017; Barbezat, 2022). The shift was, however, short-lived, with the 8.1 magnitude earthquake of 1985 destroying both the existent and complementary water distribution system. The earthquake left up to 5.3 million people without water, thus creating a service gap which was then capitalized upon by the bottled drinking water companies (Ayala *et al*., 1990; The Joint Academies Committee on the Mexico City Water Supply *et al*., 1995). Most denizens were compounded by the issues of contamination and leakages, which made it hard for them to consume the drinking water supplied via the pipe system. The denizens complained of organoleptic factors such as brown or yellow water, which prompted them to purchase bottled water as an alternative since it was safer but more costly (Malkin, 2012).

Fast forward to 1991, Mexico was hit by a cholera outbreak which further exacerbated the water supply issues. As per the World Health Organization (WHO, 2022b), cholera is spread via contaminated sources of water which partially explains the prevalence of the outbreak in Mexico. The outbreak spanned from 1991 to 2001, with up to 45,000 recognized cases (Alam *et al*., 2012; Mexico Secretary of Health, 2008; Zapata, 2000). Contrarily, there were thousands of unrecognized and suspected cases with the people associating the outbreak with the below-par water

supply system (Sepúlveda, Valdespino, & García-García, 2006). An influx in mistrust was correlated with beverage companies like Coca-Cola and Danone taking control of the market

Castano (2012) further shows that the government facilitated the market entry of the companies since it felt that it had fallen short of its objectives to supply the people with safe water. The firms utilized the consumer-choice theory coined by Rivera-Ferre (2009) to signal a shift from tap water toward bottled water. The customers felt that bottled water was a safer and more effective source since it was devoid of any contaminants that could spark an outbreak similar to the one witnessed in 1991 (Linden, 2013; Sajjadi, Alipour, Matlabi, & Biglari, 2016; Sisto, Ramírez, Aguilar-Barajas, & Magaña-Rueda, 2016; Wunderlich, St. George-Freeman, Galindo, Brown, & Kumpel, 2021). The apparent lack of market regulation further ensured that the beverage companies took hold of the target market and harnessed perceptions that were against the government-funded water supply system (Etale *et al*., 2018; Greene, 2018).

Arriaga-Medina and Piedra-Miranda (2021) build upon this disposition by highlighting that the corporations have transfigured the value of drinking water through their marketing strategies (McLeod & Blumler, 1987). There has been a change in perception that water is a commodity related to a myriad of lifestyles, beliefs and ideas. Previously, water was termed an essential element of life, with every person holding the right to safe and equitable access. Corporations have thus far capitalized on water insecurity and connected bottled water with rich or middle-income lifestyles as well as safety and health beliefs (McCulligh *et al*., 2020).

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As of 2010, bottled water consumption in Mexico had risen to 234 liters per year which is quite high compared to the 134 liters per year reported in Germany (Espinosa-García *et al*., 2015). A comparative analysis of Mexico's and Brazil's per capita consumption reveals that the former has a higher rate of up to 10 % on an annual basis. This is because bottled water is the main source for more than 80 % of the population (Espinosa-García *et al*., 2015).

Furthermore, the consumption per capita has increased due to information asymmetry, with the customers complaining of a lack of transparency regarding how the water is treated or distributed. The trust regarding tap water has dwindled in tandem with overall satisfaction (Delpla *et al*., 2020). Most of the customers present organoleptic reasons such as odour, turbidity, bad taste and dirt as the main reasons why they do not consume tap water. Health comes in second, with the people citing the importance of avoiding a repeat outbreak as the one witnessed in the 20th century (Biswas & Uitto, 1999).

Consequently, Pacheco-Vega (2019) denotes that the Mexican government has done nothing to handle the concerns raised by customers regarding drinking water. The government understands that water insecurity is a major phenomenon in the cities and rural areas due to its inability to enable a steady water supply as well as the lack of supporting mechanisms, infrastructures and strategies that improve accessibility (Pacheco-Vega, 2019; Raj, 2005; Suffet & Rosenfeld, 2007). As a matter of fact, the government has facilitated the entry of beverage companies under the assumption that bottled water can help Mexico attain the SDG 6 requirements.

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Parag and Roberts (2009) argue that the environmental impact of consuming bottled water is 100 times higher than tap water consumption. Espinosa-García *et al*. (2015) allude that the increased reliance on bottled water has made the government and people completely oblivious of the probable risks (Whelton, Dietrich, Burlingame, Schechs, & Duncan, 2007). At the top of the risk matrix is the generation of polyethene terephthalate waste by beverage companies and consumers (Diduch *et al*., 2013; Delpla *et al*., 2020; Parag & Roberts, 2009; Dorria, 2006). The solid waste from the bottled water causes energy expenses related to the production processes. Furthermore, the waste has deleterious effects on the environment since most of the bottles are non-recyclable (Etale *et al*., 2018; Greene, 2018).

Vega *et al*. (2011) further show that bottled water contains hydrocarbons which are caused by anthropogenic sources. Since the water is derived from aquifers in and around Mexico, the risk of consuming polycyclic aromatic hydrocarbons and fluoride increases (Martínez-Mier *et al*., 2005; Mazari-Hiriart *et al*., 2005). Furthermore, Da-Silva-Costa *et al*. (2021) highlight that water bottles contain bisphenol and phthalates, which have potential estrogenic effects on the bodies of consumers. An influx in estrogenicity can undermine development and maturation as well as digestive system issues. Moreover, research shows that tap water contained higher levels of fluoride compared to bottled water which contributes to decreased confidence and high consumption of the latter as a viable choice (Linden, 2013; McCulligh *et al*., 2020; McCulligh & Tetreault, 2017).

The preceding systematic review evaluates the causal factors behind the rise in demand for bottled water in Mexico. Despite their

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seminal nature, the works of erudition barely evaluate the importance of regulating bottled water production. In light of this, there is a need for more research on how the beverage companies can be regulated with regard to the quality and price of bottled water that they produce (Smith, Jackson, Peters, & Herrera-Lima, 2020; Murray, 2020). This will go a long way in mitigating the risk of contaminants in bottled water which contribute to health disparities. Furthermore, the price regulations will ensure that every denizen can afford bottled water regardless of their income level.

Conclusion

In due summation, bottled water consumption in Mexico is increasing on an annual basis which in turn facilitates growing dissatisfaction with regard to the government-funded water supply systems. The reasons for the growing consumption rates of bottled water consumption in the country include organoleptic and health issues. Furthermore, previous occurrences such as the 1985 earthquake and cholera outbreak in 1991 facilitated the surge in demand for bottled water. This has, in turn, made it hard for the government to apprise the people of the benefits of tap water, thus losing focus and control over its role in the water supply system. Consumer perceptions have not been positive, particularly with tap water, so people have opted for bottled water. This has had other implications, such as the increase in the bottled water sales business that is concentrated in a few companies such as Pepsi, Coca-Cola and Danone.

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The research has positive implications for public administration as it explores the correlation between customer choice and government responsibilities. Using this insight, the government of Mexico can develop an iron-clad mechanism that improves customer satisfaction by minimizing the service quality gaps inherent in the water supply systems. However, there is a need for more research on how the beverage companies can be regulated because it is something that has been getting out of control by the government.

Acknowledgments

Instituto Politécnico Nacional is thanked for the financial support provided through the Secretariat for Research and Graduate Studies within the framework of the scientific research and technological development project with SIP registration: 20230705, entitled "Responsible social consumption of bottled water in Mexico in the face of a circular economy".

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