

Bottled Water Consumption: The Case of Italy

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The aim of this research is to analyze the beverage sector, with particular reference to the bottled water sector. The main findings suggest there is a connection between trends in bottled water consumption and the economic status of a given country, although a country's GDP is not the only economic indicator influencing bottled water consumption. In addition, the annual per capita bottled water consumption of a certain geographic area does not depend only on the availability of drinkable water, but also on other factors such as economic, natural, commercial and cultural aspects.

JEL Codes: M10

1. Introduction

The beverage sector encompasses the production and commercialization of bottled water, non-alcoholic drinks, beer and fruit juices. The following research will specifically focus on the bottled water sub-sector.

The aims of this survey are threefold. First and foremost, we wanted to analyze whether the economic progress of a given continent or geographic area is one of the factors influencing the demand for bottled water in this context. To achieve this first objective, the following research question (RQ1) is asked: *is there any connection between the economic status of a certain geographic area and the area's demand for bottled water?* Second, we focus on the existing relationship between a continent's bottled water consumption and the availability of drinkable water. To achieve this second objective, the following research question (RQ2) is asked: *is there any connection between a continent's bottled water consumption and the availability of drinkable water within the continent?* Last, we analyze the Italian situation as set forth by the literature and the market data, particularly representative in terms of bottled water consumption; indeed, the country accounts for the highest per capita bottled water consumption of the ten main national markets. For this purpose, we analyze consumption differences in Italy, and attempt to establish a connection between these and the availability of drinkable water within the country. To achieve this third objective, the following research question (RQ3) is asked: *with reference to Italy, considered a particularly representative bottled water market in the world, is there a connection between the consumption of bottled water and the availability of drinkable water to Italian consumers?*

The motivation for this study is related to the observation of the profound changes concerning the bottled water sector in recent years that influence the opportunities for companies. As recently as the seventies, consumers considered bottled water to be a luxury product, with its utilization being primarily linked to therapeutic reasons, so

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preference was always given to drinkable water. Since the eighties, however, increased distribution and reduced prices have allowed bottled water to be sold at lower prices, making it more accessible. This was also enhanced by the introduction of plastic containers which, thanks to their low cost and weightlessness compared to glass, also allowed the reduction of total costs, as well as being more convenient for consumers in terms of transportation and use. The changes to the sector described above have noticeably influenced the activity of its economic operators. Bottled water has moved from a “commodity” to a marketable product: brand competition has increased, while the management of price, logistics and promotions has become a crucial aspect, along with the enhancement of consumer loyalty (Pierfranco 2010).

In addition, up until the nineties there was huge fragmentation within the market, due to the number of small enterprises operating at a local level. Subsequently, the entry of big multinationals into the market led to a concentration of large companies offering a number of sources and brands, that had traditionally been provided by such local small and medium companies. Currently, the market is dominated by four different international players: Nestlé Waters (with a market share of 19%), Danone (10%), The Coca Cola Company (9%) and Pepsico (5%) (Bevitalia 2011). In addition to the big companies now in operation, a few small enterprises still survive.

The findings of the current study make a contribution to the existing literature on the topic. This research is in fact multidisciplinary: it establishes a connection between contextual macroeconomic aspects (such as the country's GDP and the consumptions), other factors that are linked to the territory's richness in terms of natural resources (including water), and the business opportunities for firms operating in the field.

The current study employs a multidisciplinary approach to produce findings by which to contribute to current literature. In particular, we analyze the opportunities of the sector companies in relation to certain macroeconomic factors (such as the country's GDP and the consumptions), relating them with others linked to the natural environment, such as the quality of the water provided (Grondin et al. 1996). Furthermore, with reference to the Italian market, which is considered particularly indicative of the worldwide consumption of bottled water, relevant differences within its geographic areas are highlighted: such information provides important data for companies operating in the field, or those interested in doing so.

The aims of this survey are threefold. First and foremost, we wanted to analyze whether the economic progress of a given continent or geographic area is one of the factors influencing the demand for bottled water in this context. To achieve this first objective, the following research question (*RQ1*) is asked: *is there any connection between the economic status of a certain geographic area and the area's demand for bottled water?* Second, we focus on the existing relationship between a continent's bottled water consumption and the availability of drinkable water. To achieve this second objective, the following research question (*RQ2*) is asked: *is there any connection between a continent's bottled water consumption and the availability of drinkable water within the continent?*

The research findings differ from previous studies at the empirical level. Our approach is not limited to analyze the sociological and marketing aspects at the base of the consumption of bottled water. Indeed, this research focused on the relationship between a continent's bottled water consumption and a natural environment factor, represented by the availability of drinkable water. It permits to analyze the reasons

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affecting consumptions, especially in countries where the drinkable water would be available.

In addition, the current study focused on the Italian market, considered as a representative one in terms of bottled water consumption (the country accounts for the highest per capita bottled water consumption of the ten main national markets). We investigated the possible differences in consumption between the different parts of the country, which have good availability of drinkable water. These results have allowed to identify which areas are more attractive to a commercial investment by the companies.

This research is organised into the following sections: first of all, we analyse the literature concerning bottled water consumption. After a description of the methodology used in the research, the research findings are presented. Conclusions, including the implications and limitations of the research, complement the work.

2. Literature Review

A large body of literature has concentrated on the water market (Raftelis 1993; Beeker 2000; Maxwell 2005; Gleick 2010). Water can be considered an economic resource, as its availability across the planet is limited. It contributes to the fulfilment of human needs, which can be satisfied through economic, private or public goods (Ferrero 1987; Farneti 2007). In addition, water has been considered as a citizen's right that governments must protect (Beecker 2000; Trentmann & Taylor 2006).

Bottled water can also be defined as natural mineral water – that is, “water that originates from an underground layer or repository, comes from one or more natural or artificial springs and has particularly hygienic characteristics and perhaps properties which are beneficial to health” (Mosca, Sanzini & Aureli 2006). Natural mineral water must, from the spring onwards, meet legal limits on the amount of pathogenic micro-organisms, saprophytic micro-organisms, human pollutants and natural pollutants contained within. Such water is bottled at the source, which makes it possible to retain all of its characteristics until the moment it is consumed. Drinkable water may also originate from surface water sources (rivers, natural or artificial lakes); hence, it must be disinfected and purified prior to distribution. Bottled water differs from drinkable water (or tap water), since the latter has not undergone any purification process (Falco 2003). Another distinguishing element is, of course, price, as bottled water is much more expensive, on average, than tap water.

Water usage has, throughout time, changed greatly. In the past, thirst was satisfied by wine and beer, bearing in mind that these beverages were once a lot less alcoholic compared to the present day (Mascha 2006; Gately 2008), and several studies confirm that Louis XVI used to drink more than a litre of champagne at breakfast (Taylor 1998; Andrew 2007). In fact, in the past, drinking water could be very dangerous due to the poor hygienic conditions surrounding it (Shiklomanov 1998; Mantelli & Temporelli 2007).

Once water pollution issues could be overcome, more and more attention was devoted to developing methods by which to store it, which first included jugs (in the 19th century), and then glass bottles (Mascha 2006) thanks to the rise of the bottling industry, which has been expanding since the 20th century (Howard 2003; Samek, Land Use & Env'tl 2003; Black 2009).

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Many studies have been conducted on the application of Maslow's theory of water consumption (Friberg & Ganslandt 2003). Human needs are perceived as an understanding or awareness of a lack of something (Airoldi, Brunetti & Coda 2005); thus, individuals create a circle of needs – i.e. a kind of hierarchical scale (Borgonovi 1973) – in relation to their expectations and desires (Bocchino 1993). According to Maslow, these needs can be classified into five different categories: physiological, security, love and connection, self-esteem and self-fulfilment. These different categories are interrelated. Furthermore, if an individual is unable to satisfy a certain category of needs, they will be unaware of needs belonging to higher categories (Pavan 2008): therefore, in the context of the current study, if a subject does not have the economic means by which to buy the cheapest water on the market, it follows that they will not feel the need to buy the most expensive.

In the water market, there are two types of human needs to be satisfied:

a) Essential or primary needs: this relates to drinking in order to survive and cope with the external conditions set by the climate (e.g. during summer, the need to drink increases) and activities carried out (e.g. jogging). In addition, an individual might need to drink water with specific organoleptic characteristics for reasons of health (for instance, mineral water may be used in preparing meals for newborns or to prevent certain diseases): in this manner, water becomes a therapeutic drink (Magiera 1994; Olson 1999; Strang 2004);

b) Secondary or unnecessary needs: this category can be broken down into two further needs:

b1) Social needs: they are linked to the desire to show that we belong to a particular social class, or to exhibit our own wealth. The use of bottled water has become a means by which consumers can distinguish themselves from others, for instance because they consider bottled water to be healthier than tap water (Ferrier 2001; Doria 2006; Royte 2008). Drinking bottled water has also become a status symbol for consumers (Allen 2002; Underwood 2003).

b2) Communicative needs: they are triggered by the will to communicate through either material (as in the bottle of water) or immaterial (as in the brand or the packaging) objects. This highlights the power of trademarks used by the bottling industry (Karthikeyan & Balakrishnan 2008; Marty 2008);

b3) Protection needs: they became from the risk of contamination. Often, consumers drink bottled water because it feels more secure than the consumption of tap water, due to the risk of contamination from the external agents, for example the pollution of waters (Beck 1992; Wilk 2006).

Whilst primary needs are satisfied by goods that are considered necessary, such as tap water or a low-cost mineral water, secondary needs are satisfied by unnecessary goods (Levallois, Grondin & Gingras 1999; Spar & Bebenech 2008). For instance, we may consider an expensive bottle of mineral water to be unnecessary, either because of its specific organoleptic features or because of certain refined aspects of its packaging. If the resources available to an individual are scarce, they are likely to satisfy their primary needs first (as in quenching their thirst by drinking tap/low-cost water). Then, in proportion to their available income, their behaviour may change: they may tend to look for different products in terms of quality, features and costs, in order to satisfy the same need. It should be borne in mind that an inexpensive mineral water can satisfy the human thirst-quenching need as effectively as an expensive one.

Recent studies have highlighted the fact that bottled water consumption is higher in Italy than in other countries, with consumption of up to 40 litres per person (Rosenthal

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2009). Unlike many other international markets, in Italy one of the main reasons for drinking bottled mineral water is the belief that it is beneficial to health because of its nutritional properties (Black 2009).

Some studies have focused on the importance of the packaging of bottled water as a main element of product distinction (Spethmann 1994; Underwood 2003). For this reason, it has become crucial for the water industry to pay due consideration to packaging in order to increase its consumer base (Ferrier 2001; Som 2008; Crook, Whitefield & Jackson 2009).

The current study employs a multidisciplinary approach to produce findings by which to contribute to current literature. In particular, we analyze the opportunities of the sector companies in relation to certain macroeconomic factors (such as the country's GDP and the consumptions), relating them with others linked to the natural environment, such as the quality of the water provided (Grondin et al. 1996). Furthermore, with reference to the Italian market, which is considered particularly indicative of the worldwide consumption of bottled water, relevant differences within its geographic areas are highlighted: such information provides important data for companies operating in the field, or those interested in doing so.

The problem statement has not been answered by past studies, in terms of the empirical level. Indeed, previous studies focused on the relationship between a continent's bottled water consumption and sociological and marketing ones factors. On the contrary, they didn't consider the relationship between a continent's bottled water consumption and a natural environment factor, represented by the availability of drinkable water. This approach permits an analysis of the underlying reasons affecting consumptions, especially in countries with a large availability of drinkable water.

In addition, our research investigates the Italian market, considered as a representative one in terms of bottled water consumption. Due to the investors interests, we highlighted the different market potential, in relation to the various parts of the country.

3. Methodology

This research has been based on the literature review summarized above, which has considered both national and international studies. In addition, a large number of articles in journals and reviews in either this or related economic fields have been analyzed. The macroeconomic data has been gathered from the annual reports of several authorities and organizations (Eurocontrol, Eurostat, Istat), which contain the trends of the main macroeconomic indicators of a country or a continent. Moreover, data on the beverage industry has been drawn from important associations and market research societies operating in the field, including Global Drinks and Bevitalia.

In order to meet the aims of this research, the following research questions have been set forth, as outlined above:

- 1) *RQ1: is there any connection between the economic status of a certain geographic area and the area's demand for bottled water*
- 2) *RQ2: is there any connection between a continent's bottled water consumption and the availability of drinkable water within the continent?*
- 3) *RQ3: with reference to Italy, is there a connection between the consumption of bottled water and the availability of drinkable water to Italian consumers?*

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On the basis of these research questions, the following hypotheses have been developed:

1) H1: there's a connection between the economic status of a certain geographic area and the area's demand for bottled water. This economic status may be represented by GDP, even if it is not the only economic indicator which influence trends in its consumption of bottled water. H1 is paired with RQ1.

2) H2: there's a modest connection between the continent's bottled water consumption and the availability of drinkable water within the continent. Indeed, the consumption may be influenced by other factors, including the economic factor (as the availability of resources consumers to spend on bottled water), the commercial factor (affected by advertising policies of the companies) and the cultural factor (linked to consumers' habits of drinking tap water rather than bottled water). H2 is paired with RQ2.

3) H3: with reference to Italy, there's a modest connection between the consumption of bottled water and the availability of drinkable water. As indicating for H2, the trends in consumption depends on different factors (economic, commercial and cultural ones), influenced by the level of citizens' welfare. H3 is paired with RQ3.

In addition to the literature and market data analysis, we have used some indicators (after referred to as "ratios") which have allowed us to address the research questions. With particular reference to RQ1, we created Ratio A. This compares bottled water consumption to a given geographic area's GDP between 2002 and 2010.

$$\text{Ratio A} = \frac{\text{Variation (\%)} \text{ of bottled water consumption within a geographic area}}{\text{Variation (\%)} \text{ of GDP within the geographic area}}$$

It is assumed that, all other conditions being equal, the GDP is indicative of a certain population's revenue, which will influence their ability to buy bottled water. Obviously, a country or a geographic area's GDP is not the only economic indicator which will influence trends in its consumption of bottled water; nevertheless, at this very early stage of our research, we have opted to begin with this economic indicator, with the intention to enhance the method in the future. The possible scenarios for Ratio A are as follows:

a) if Ratio A is > 0 : the bottled water consumption and the GDP within the geographic area have a concurring trend – that is, they have both grown or decreased. In other words, the trend in bottled water consumption is in line with the economic status of the area;

b) if Ratio A is < 0 : the bottled water consumption and the GDP within the certain geographic area have a contrasting trend. In other words, a certain trend in bottled water consumption is not influenced by the economic status of the area.

With particular reference to RQ2 and RQ3, two ratios have been created: Ratio B and Ratio C. Ratio B, which represents an "availability" indicator, compares the availability of drinkable water in 2009 to the population within a certain geographic area.

$$\text{Ratio B} = \frac{\text{Availability of drinkable water within a geographic area}}{\text{Population in the geographic area}}$$

The objective here is to quantify the average per capita availability of drinkable water

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within a certain geographic area. The possible scenarios for Ratio B are as follows:

- a) if Ratio B is > 0 : the area has a higher availability of drinkable water compared to the demand for drinkable water by the population overall. This does not mean that there is equal water distribution across the whole territory, however: for instance, in African deserts water is scarcer than it is in other areas of Africa. On the other hand, this indicator considers the availability, within a certain geographic area, of the water resource that is usable by its population;
- b) if Ratio B is < 0 : the area has a lower availability of drinkable water, compared to the demand for drinkable water by the population overall.

Ratio C integrates the informative value of Ratio B. Ratio C, which represents a “consumption” indicator, compares bottled water consumption in 2009 with the “availability” indicator of drinkable water in the region (represented by the Ratio B). This allows us to verify whether bottled water consumption increases as the availability of drinkable water within the area decreases, considering that bottled water can also be imported from other countries or continents.

$$\text{Ratio C} = \frac{\text{Bottled water consumption in the geographic area}}{\text{Ratio B for the geographic area}}$$

The possible scenarios for Ratio C are as follows:

- a) if Ratio C is > 0 : the level of “consumption” of bottled water within a given geographic area is higher than the level of “availability” of its drinkable water;
- b) if Ratio C is < 0 : the level of “consumption” of bottled water within a given geographic area is lower than the level of “availability” of its drinkable water.

The study period being analysed is different from the RQ, because of the type of research questions and the availability of data. With particular reference to RQ1, we compare bottled water consumption to a given geographic area’s GDP between 2002 and 2010, observing its trend. With particular reference to RQ2 and RQ3, only one year has been considered (2009), due to the unavailability of data on a greater period.

The approach used here is multidisciplinary, because it has established a connection between: on the one hand, several contextual macro-economic aspects and certain other factors that are linked to a territory’s richness in terms of natural resources (i.e. water); on the other hand, the business opportunities for firms operating in the field. Therefore, this approach permits to improve previous studies by incremental inputs, also referring to the impact of the recent world financial crisis (that influences both GDP and consumption) on the bottled water consumption.

The research method have improved the previous study by incremental inputs. Indeed, it employs not only sociological and marketing factors, but also a natural environment factor (represented by the availability of drinkable water), making a correlation with bottled water consumption.

4. Findings

The study results address the following areas:

- a) analysis of the world context, with reference to the existing connection between the demand for bottled water and the economic status of a certain geographic area (RQ1);

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b) analysis of the world context, with reference to the existing connection between the bottled water consumption of a certain geographic area and the availability of drinkable water within that area (RQ2);

c) analysis of the Italian context, with reference to the relationship between bottled water consumption and water availability in different areas of the country (RQ3).

4.1 Bottled Water Demand Trends Versus the Economic Trends Within a Geographic Area

With reference to RQ1 – *is there any connection between the economic status of a certain geographic area and the area's demand for bottled water?* – it is necessary, first of all, to analyze the global consumption of bottled water. Table below shows the worldwide consumption of cold, non-alcoholic beverages (including bottled water, fruit juices and other natural drinks) (Table 1).

Table 1 Global Consumption of Non-Alcoholic Beverages

Beverage categories	Global consumption (billions of litres)					Percentage of total (in 2010)	Variation between 2006-2010	Per capita consumption (in 2010)
	2006	2007	2008	2009	2010	%	%	litres/year
Bottled water	176.5	185.1	195.3	203.0	210.5	39.7	+19.3	30.8
Pre-packaged beverages	210.9	218.8	221.7	224.2	229.0	43.2	+8.6	33.5
Dilutable drinks	30.0	30.5	30.8	31.3	31.8	6.0	+6.0	4.7
Fruit juices	53.2	55.2	56.7	57.1	58.4	11.0	+9.8	8.6
Total	470.6	489.6	504.5	515.6	529.7	100.0	+12.6	77.6

Source: Bevitalia 2011.

The worldwide consumption of non-alcoholic drinks amounted to 529.7 billion litres in 2010; such consumption increased by 12.6% between 2006 and 2010, reaching a total annual per capita consumption of 77.6 litres. Furthermore, worldwide bottled water consumption amounted to 210.5 billion litres. Consumption increased by 19.3% between 2006 and 2010, reaching an annual per capita consumption of 30.8 litres. In 2010, bottled water consumption constituted 40% of the total consumption of non-alcoholic beverages. The majority of non-alcoholic beverages consumed were pre-packaged beverages, which reached 229 billion litres – i.e. 43.2% of the total consumption, with an annual per-capita consumption of 33.5 litres.

It is interesting to compare the average annual per capita bottled water consumption of each continent (Table 2).

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Table 2 Per Capita Consumption of Bottled Water In Each Continent

Continent	Per capita consumption of bottled water (litres/year)		Variation 2003/2010
	2003	2010	
Europe	46.3	51.4	+11.0%
America	43.7	60.1	+37.5%
Asia	8.9	13.6	+52.8%
Oceania	27.6	51.6	+87.0%
Africa	2.4	5.9	+145.8%
Total	128.9	182.6	+41.7%

Source: Bevitalia 2011

In terms of the annual per capita consumption, the industrial continents account for the highest level of consumption. With particular reference to 2010, America registered the largest per capita consumption (60.1 litres/year), followed by Oceania, with 51.6 litres/year, and then Europe, with 51.4 litres/year. On the contrary, the remaining two continents, which consist of developing, emerging or underdeveloped countries, have much lower per capita bottled water consumption: Asia has a per-capita consumption of 13.6 litres/year, whilst Africa has a per capita consumption of 5.9 litres/year.

On one hand, if we analyze the continents with reference to the increase in their per capita bottled water consumption between 2003 and 2010, continents which contain emerging, developing or underdeveloped countries exhibit much higher increases: specifically, Africa's consumption increased by 145.8%, and Asia's increased by 52.8%. On the other hand, the more industrial continents have registered the lowest increases in terms of per-capita consumption: Europe increased by 11.0%, and America by 37.5%. From this we can deduce that in countries where inhabitants have been consuming bottled water for many years, the market is now mature and increases in consumption are lower. On the contrary, increases in consumption are much higher in those markets wherein bottled water has been consumed for a shorter period of time, since the bottled water market still has further opportunities to grow.

In order to answer RQ1, we chose to reduce the observation group to the ten main markets of bottled water in the world, in order to carry out a more representative enquiry. We have to consider, in fact, that the ten main markets mentioned above consumed, in 2010, over 70% of the global volume of bottled water. Among them, the top five consumed over 50%. Ratio A, as outlined in the methodology, has been calculated for the top ten national markets (Table 3).

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Table 3 Ratio A for the Top Ten National Markets in Bottled Water Consumption

Countries	GDP growth 2002-2010 (%)	Variation in the consumption of bottled water from 2002-2010	Per capita bottled water consumption (litres/year)	Ratio A
USA	+46.0%	+57.1%	98	1.24
China	+77.0%	+136.9%	19	1.78
Mexico	+74.1%	+26.3%	149	0.36
Indonesia	+55.4%	+148.3%	62	2.68
Germany	+34.6%	+32.3%	160	0.93
Italy	+23.4%	+10.9%	186	0.47
Brazil	+62.1%	+78.7%	56	1.27
Turkey	+105.3%	+71.7%	126	0.68
France	+39.3%	-14.8%	115	-0.38
India	+52.6%	+273.7%	6	5.20

Source: personal processing on Bevitalia data

In every country (except France), Ratio A is > 0 : this means that the bottled water consumption and the GDP within the geographic area have a concurring trend; therefore, the trend in bottled water consumption is in line with the economic status of the area. Ratio A varies according to the geographical area considered. It is highest for emerging countries, which reflects their increasing consumption of bottled water.

India, with the highest growth in bottled water consumption (+273.6%), and a Ratio A of 5.20, represents a very interesting market for companies in the field; on the other hand, however, the poverty of the majority of the population means that the per capita consumption is still very low (6 litres/year). After India, Indonesia has the largest increase in consumption (+148.3%), and a Ratio A of 2.68, with an annual per capita consumption of 62 litres/year. This is followed by China, which still has very low annual consumption per capita (19 litres/year), and represents an extremely interesting growth area for firms (+136.9%). Asiatic countries are characterized by lower per capita bottled water consumption due to the late introduction of the drinkable water bottling industry, as well as the economic conditions of the country during the years under examination. In addition to bottled water, multinationals have recently begun to launch other beverages, such as water-based drinks. As a result, consumption of sparkling drinks and/or beer has been higher than bottled water.

With reference to the European markets, Ratio A is < 1 : this means that increases in bottled water consumption have been lower than increases in each country's GDP. Italy has the highest per capita bottled water consumption of the ten main national markets. This is true despite the large amounts of high-quality drinkable water available in the country (this is in contrast to Mexico, which represents the third-largest consumer in the world with 149 litres/year per capita in 2010, but has at its disposal a limited amount of drinkable water). Italy represents the lowest increase in consumption (10.9%), since the market is now mature: in 2002 the country was ranked fourth, whilst in 2010 it was ranked sixth, with an annual per capita consumption of 186 litres/year. Nevertheless, it still holds the world and European record for per capita bottled water consumption, thanks also to the moderate cost of bottled water (which is also the case for Mexico). Within Europe, Germany has the highest total consumption, with a growth of 32.3% and

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an annual per capita consumption of 160 litres. In the case of France, Ratio A is negative: despite having registered an increase in the GDP over the years, bottled water consumption has reduced (Ratio A = -0.38).

A different reasoning has to be given in the case of the USA. This region is at the top of the 2010 rating, with a total consumption increase of 57.1% and an annual per capita consumption of 98 litres/year. Unlike other industrial countries, their Ratio A is higher than 1 (1.24). This means that increases in water consumption in the country have been higher than increases in its GDP. This is also due to the fact that the USA has the highest consumption of bottled water out of the ten main markets in the world.

In answering RQ1, even if the country's GDP is not the only economic indicator affecting trends in bottled water consumption, it is also possible to identify a connection between the demand for bottled water and the economic status of a country. Furthermore, with reference to emerging countries (India, China and Indonesia), increases in their water consumption have been much higher than their GDPs, which confirms that the bottled water market is still in an expansion phase.

The analysis of the connection between the demand for bottled water and the economic status of a country demonstrates the validity of H1.

4.2 Demand for Bottled Water Versus the Availability of Drinkable Water in a Given Geographic Area

With reference to RQ2 – is there any connection between a continent's bottled water consumption and the availability of drinkable water within the continent? – it emerged that bottled water consumption is also influenced by other factors which are often difficult to quantify, such as: the existence of infrastructures that are suitable for transporting drinkable water and distributing to final consumers; the intrinsic quality of the continent's water resources, which affects the water's suitability for human consumption. There is no means by which to test the differences amongst the various areas on a global scale with reference to these factors; therefore, we have chosen to consider only the availability of drinkable water within a continent, and thereby establish its connection with bottled water demand.

It is worth considering that 71% of the planet's surface is covered by water, of which 97% is salty. With regards to fresh water, 68.9% is contained in perpetual glaciers, 29.9% is underground, and 0.3% is in lakes and rivers. Only the latter represents a potential source, at a percentage of 0.008% within the total amount of water on the planet, however unequally distributed. As a result, there are 1.68 billion people in the world for whom drinkable water is lacking in availability (Istat 2009).

Ratio B and Ratio C are displayed below for each continent (Table 4).

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Table 4 Ratio B and Ratio C by Continent

Continent	Ratio B	Ratio C
Asia	4.05	2.20
America	28.39	1.54
Africa	5.49	0.44
Europa	4.81	9.62
Oceania	86.21	0.32

Source: personal processing on Bevitalia

In analyzing Ratio B, which represents an “availability” indicator, it is evident that the per capita availability of drinkable water is extremely variable, according to the area in question. In particular, the continent which has the highest level of available drinkable water per capita is Oceania (Ratio B = 86.21). Some way behind this we find America (Ratio B = 28.39). We can deduce from this that per capita water availability for an inhabitant of Oceania is about three times higher than for an inhabitant of America. The continent possessing the lowest per capita availability of water is Asia (Ratio B = 4.05). Europe also has limited per capita water availability (Ratio B = 4.81), which is even lower than Africa (Ratio B = 5.49). As a consequence, per capita water availability for an inhabitant of Oceania is over 20 times that of an inhabitant of Asia; while availability for an inhabitant of America is over seven times that of an Asiatic inhabitant. Ratio B is used to calculate Ratio C, which allows a comparison of the bottled water consumption on a continent vs. the availability of drinkable water. This makes it possible to verify whether bottled water consumption increases as the quantity of available drinkable water in that area decreases, by virtue of the fact that bottled water can come from different countries or continents.

Europe has the highest figure for Ratio C (9.62): consumers use bottled water both because the availability of water is lower than in other continents, and because of other factors, including: the economic ability of its consumers; the advertising investments of firms in the region, which have an influence on consumption choices since they push consumers to buy bottled water; the “fashion” to drink bottled water. Hence, in Europe there is still a strong connection between bottled water consumption the continent’s water availability. Ratio C for Asia is 2.20: bottled water consumption is linked to the scarcity of natural water. At the same time, however, it should be noted that Ratio C for Asia is about one-fifth that of Europe, as the Asian per capita consumption of water is very low due to the limited economic possibilities of its inhabitants. A moderate connection exists between the annual per capita consumption of the continent, and its water availability.

Ratio C for America is 1.54: since its water availability is good, consumers use bottled water mainly out of choice, and are probably influenced by advertising investments that push them to buy bottled water. There is no connection between the annual per capita consumption of bottled water on this continent, and its drinkable water availability. Ratio C for Africa is 0.44: the continent has low water availability; nevertheless, the annual per capita consumption of bottled water is very low, since one of their main problems is that they lack water that is suited to domestic purposes, as well as for drinking. In addition, the low average economic status of the inhabitants means that they are unable to purchase bottled water. Thus, mainly due to economic issues on the continent, there is no connection between its annual per capita water consumption and

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its water availability. Ratio C for Oceania is 0.32: since the continent has the highest water availability, consumers use bottled water in moderation. A very strong connection exists between the annual per-capita consumption of bottled water on the continent, and its water availability.

With reference to *RQ2*, we can thus conclude that there is not always a connection between the annual per capita consumption of bottled water on a continent and its drinkable water availability. This is because consumption is in fact not influenced by water availability alone, but is also affected by other factors, including:

- a) the economic factor, which is linked to the availability of resources consumers can put towards bottled water (as an alternative to tap water);
- b) the natural factor, which is linked to the availability of drinkable water that is pleasant in terms of taste, to the point that consumers will avoid consuming bottled water;
- c) the commercial factor, which is linked to the advertising investments made by enterprises operating in the field, and affects consumption choices by pushing consumers to buy bottled water;
- d) the cultural factor, which is linked to consumers' habits of drinking tap water rather than bottled water.

The validity of H2 has been demonstrated.

4.3 Analysis of the Italian Market

In terms of *RQ3* – with reference to Italy, is there a connection between the consumption of bottled water and the availability of drinkable water to Italian consumers? – the focus is on analyzing whether bottled water consumption in the Italian territory is affected by the availability of drinkable water designed to be distributed via communal systems. As mentioned above, the Italian market is particularly interesting, as it represents the highest per capita bottled water consumption of the ten main national markets. The Italian trends in bottled water consumption between 1980 and 2011 are shown below (Table 5).

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Table 5 Bottled Water Consumption in the Italian Market

Year	Bottled water production		Import/export		Consumption		Per-capita consumption	
	Billions of litres	Var. %	Billions of litres	Var. %	Billions of litres	Var. %	Litres	n. indexes
1980	2350		na	na	2350		47	100
1985	3400	+44.6	na	na	3400	+44.6	65	138
1990	6100	+79.4	na	na	6100	+79.4	110	234
1991	6700	+9.8	na	na	6700	+9.8	118	251
1992	7200	+7.5	na	na	7200	+7.5	126	268
1993	7500	+4.2	na	na	7500	+4.2	131	279
1994	8000	+6.7	-200	---	7800	+4.0	136	289
1995	8150	+1.9	-270	+35.0	7880	+1.0	138	294
1996	8450	+3.7	-320	+18.5	8130	+3.2	141	300
1997	8800	+4.1	-380	+18.8	8420	+3.6	146	311
1998	9300	+5.7	-450	18.4	8850	+5.1	153	326
1999	9750	+4.8	-490	+8.9	9260	+4.6	160	340
2000	10360	+6.3	-680	38.8	9680	+4.5	167	355
2001	10750	+3.8	-730	+7.4	10020	+3.5	173	368
2002	11150	+3.7	-1060	+45.2	10090	+0.7	174	370
2003	11900	+7.6	-820	-22.6	11080	+10.8	190	404
2004	11400	-5	-770	-6.1	10630	-5.0	183	389
2005	11800	+3.5	-900	+16.9	10900	+2.6	188	400
2006	12200	+3.4	-950	+5.6	11250	+3.2	193	406
2007	12400	+1.6	-1020	-1.0	11380	+1.9	193	411
2008	12500	+0.8	-980	-3.9	11520	+1.2	192	409
2009	12400	-0.8	-1000	+2.0	11400	-1.0	190	404
2010	12150	-2.0	-1000	---	11150	-2.2	186	396
2011	12350	+1.6	1000	---	11350	+1.8	189	402

Source: Bevitalia 2011

The growth of the bottled water market in Italy appears to have come to a halt in 2007. Furthermore, since the financial and industrial crisis made its appearance in the country (as well as in the rest of Europe) in 2008, consumption of bottled water diminished. This is linked to RQ1, where we analyzed the connection between demand for water and the economic situation within the same geographical area.

To calculate the ratios for this, the Italian territory is divided into four areas:

- a) North-West (Piemonte, Valle d'Aosta, Liguria e Lombardia): this region has drinkable water availability of 26% and a population distribution of 27%;
- b) North-East (Trentino, Veneto, Friuli, Emilia Romagna): this region has drinkable water availability of 19% and a population distribution of 19%;
- c) Centre and Sardinia (Tuscany, Umbria, Marche, Lazio, Sardinia): this region has drinkable water availability of 24% and a population distribution of 30%. This is the most densely populated area in Italy, and is also a major tourist region, including both local and international tourists, which increases water consumption levels;
- d) South and Islands (Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria e Sicily): this region has drinkable water availability of 31% and a population distribution of 24%. This area has the highest water availability. It is another major tourist area, which again increases water consumption levels.

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We applied Ratio B and Ratio C to the areas above (Table 6).

Table 6 Ratio B and Ratio C in the Italian Market

Areas	Ratio B	Ratio C
North-West	0.96	1.15
North-East	1.00	1.00
Centre and Sardinia	0.80	0.67
South and Islands	1.29	1.25

Source: personal processing on Istat data, 2012

Ratio B, which represents the availability of drinkable water in relation to the population, varies according to the areas under examination. In particular, in the South and the Islands, it is > 1 (Ratio B = 1.29): this means that the availability of drinkable water is higher than the population distribution in that area; these areas, in fact, have the highest drinkable water availability in Italy, and are also less populated compared to other regions. On the contrary, in the Centre and Sardinia the value is exactly the opposite (Ratio B = 0.80), as the population distribution is higher than the water availability in the area; this is, in fact, the most densely populated area in Italy. The North-East has an equal amount of drinkable water availability compared to its population distribution (Ratio B = 1). In the North-West, the drinkable water availability is slightly lower than its population distribution: despite having good water availability (the second-best in Italy). This may be explained by the fact that it represents the country's main industrial area, meaning that industrial consumption diverts supplies from domestic consumption.

Ratio C, which represents the consumption of bottled water in relation to the area, varies according to the regions under examination. The North-West and the South and the Islands have values of > 1 . For the North-West (Ratio C = 1.15), the explanation for its higher ratio can again be found in the fact that it is a more industrialized and urbanized territory compared to other areas, which has led, thanks to the spending ability of its inhabitants, to an increase in bottled water use. In the South and the Islands (RATIO C = 1.25), this value is affected by tourism, which increases bottled water consumption. The Centre and Sardinia (Ratio C = 0.67) have the lowest ratio, mainly because of a lower amount of bottled water consumption.

With reference to RQ3, as for RQ2, we can conclude that bottled water consumption in a geographic area depends not only on water availability, but also on other factors, such as the economic, cultural and commercial aspects analyzed with reference to RQ2. The validity of H3 has been demonstrated.

6. Conclusions

It is understood that a country's GDP is not the sole economic indicator affecting trends in bottled water consumption; however, a connection does exist between bottled water consumption and the economic status of a country. Furthermore, with reference to emerging countries (India, China and Indonesia), increases in consumption have been much higher than increases in their GDP, which demonstrates that the bottled water market is currently in an expansion phase. The validity of H1 has been demonstrated.

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In addition, there is not always a connection between the annual per capita bottled water consumption of a continent or geographical area, and the availability of drinkable water. The consumption is in fact influenced by a series of factors in addition to drinkable water availability, including:

- a) the economic factor, which is due to the availability of resources consumer can use buying bottled water (as an alternative to drinkable water);
- b) the natural factor, which is linked to the availability of pleasant drinkable water in terms of taste, avoiding consumption of bottled water;
- c) the commercial factor, which is due to the advertising investments of companies that influence consumption choices by pushing consumers to buy bottled water;
- d) the cultural factor, which itself is derived from other factors. For instance, there is a “fashion” in some countries to consume bottled water rather than tap water; wide segments of customers in certain regions are oriented more towards the consumption of alcoholic drinks; and increasing attention is being paid to health.

The validity of H2 and H3 has been demonstrated.

This study has several implications for practitioners. In particular, companies operating in the field can influence bottled water consumption through advertising, regardless of the availability of drinkable water in the country. Furthermore, we have identified the countries with the highest per capita water consumption in the world, which represent particularly interesting markets for firms that are willing to invest in them. Market entry can occur either through the import of bottled water (distance permitting), or through the purchase of resources by which to bottle water – either bottling companies that are already operating in the field, or creating new enterprises.

Our research presents some limitations, which can be summarized as follows:

- a) a country's GDP is not the only economic indicator influencing trends in bottled water consumption. Nevertheless, since this study represents the early stages of our research, we have opted to consider this economic indicator alone, with the intention of improving the method in the future;
- b) these other factors can themselves influence bottled water consumption, and should therefore be quantified; for instance, the advertising investments made by the firms operating in the field push consumers to buy bottled water;
- c) our method could be improved by adopting an econometric model, which could enhance the informative degree of the research results.

This study contributes to literature on the beverage sector, with particular reference to the bottled water division, in the following ways. It shows that there is not always a definite connection between the annual per capita consumption of bottled water within a certain geographic area, and the availability of drinkable water within the area. Consumption is, in fact, influenced by other factors, not only drinkable water availability. In addition, the research shows that the Italian market, which represents the largest per capita bottled water consumption of the ten main national markets, exhibits strong differences across its geographical areas: such information can provide an interesting area of consideration for firms already operating in the field, or those interested in doing so.

References

- Airoldi, G, Brunetti, G & Coda, V 2005, *Corso di Economia aziendale*, Il Mulino, Bologna.
- Allen, MW 2002, 'Human values and product symbolism: do consumers from product preference by comparing the human values symbolized by a product to the human values that they endorse?', *Journal of Applied Social Psychology*, vol. 32, no. 12, pp. 2475-2501.
- Andrew, D 2007, *Adapting cinema to history: A revolution in the making* in Stam, R & Raengo, A, *A Companion to Literature and Film*, Wiley-Blackwell, Malden, pp. 189-209.
- Beck, U 1992, *Risk Society: Towards a New Modernity*, Sage, London.
- Beecker, JA 2000, 'Privatization, Monopoly, and Structured Competition in the water industry: is there a role for regulation?', in *Umweltaspekte einer privatisierung der wasser-wirtschaft in Deutshland*, *Proceedings of the Dokumentation der Internationalen Fachtagung*, Berlin, vol. 20, pp. 327-343.
- Bevitalia 2011, *Acque minerali, Bibite e Succhi*, Beverfood Edizioni, Milano.
- Black, R 2009, 'Acqua minerale di Sangemini: the Italian mineral water industry finds a place at the table', *Journal of Modern Italian Studies*, vol. 14, no. 2, pp. 184-198.
- Bocchino, U 1993, *L'economia delle imprese dolciarie*, Giuffrè, Milano.
- Borgonovi, E 1973, *L'economia aziendale negli istituti pubblici territoriali*, Giuffrè, Milano.
- Crook, M, Whitefield, ATW & Jackson, S 2009, *The Commodification of H2O: How water became a designed Product*, Swinburne Research Bank, Swinburne University of Technology and RMIT University, Melbourne.
- Doria, M 2006, 'Bottled water versus tap water: understanding consumers' preferences', *Journal of Water and Health*, vol 4, no.2, pp.271-276.
- Falco, G 2003, *Acque Minerali ed Acque Potabili tra Qualità e Business*, Fondazione ICU, Venezia.
- Farneti, G 2007, *Economia d'Azienda*, Franco Angeli, Milano.
- Ferrero, G 1987, *Impresa e management*, Giuffrè, Milano.
- Ferrier, C 2001, 'Bottled water: understanding a social phenomenon', *Journal of the Human Enviroment*, vol. 30, no 2, pp.118-119.
- Friberg, R & Ganslandt, M 2003, *Bottled Water – A Case of Pointless Trade?*, CEPR Discussion Papers 4145, Centre for Economic Policy Research, London.
- Gately, I 2008, *Drink- A cultural History of Alcohol*, Gotham Books, New York.
- Gleick, P 2010, *Bottled & Sold*, IslandPress, Washington.
- Grondin, J, Levallois, P, Moret, S & Gingras, S 1996, 'The influence of demographics, risk perception, knowledge, and organoleptics on water consumption patterns', *Proceedings of the AWWA Annual Conference: Management and Regulations A*. AWWA, Denver, pp. 537-546.
- ISTAT 2012, *Giornata mondiale dell'acqua. Le Statistiche dell'Istat*, Istat, Roma.
- Howard, BC 2003, 'Message in a Bottle', *E the Environmental Magazine*, vol. 14, no. 5, pp. 11-26.
- Karthikeyan, T & Balakrishnan, R 2007, *Influence of brands in packaged drinking water industry*, *Green Productivity*, Soundarapandian, New Delhi.
- Levallois, P, Grondin, J & Gingras, S 1999, 'Evaluation of consumer attitudes on taste and tap water alternatives in Quebec', *Water Science Technology*, vol. 40, no. 6, pp.135-139.

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- Magiera, M 1994 'Water Everywhere, but Only Bottles to Drink; Concerns about Purity Play into Marketers' Hands', *Advertising Age*, Special report: 'Brands in Demand', 7 February, p.6.
- Mantelli, F & Temporelli G. 2007, *L'acqua nella storia*, Franco Angeli, Milano.
- Manunta, M 2001, *Fuori i mercanti dall'acqua*, MC Editrice, Milano.
- Marty, N 2008, 'L'eau embouteillée: histoire de la construction d'un marché', *Enterprises et histoire*, vol. 1, pp.86-99.
- Mascha, M 2006, *Fine Waters*, Quirk Books, Philadelphia.
- Maxwell, S 2005, *The State of the Water Industry - 2004*, Water Encyclopedia 2005, John Wiley & Sons Publisher, Hoboken.
- Miquel, G 1999, *Recyclage et valorisation des déchets ménagers*, Rapport 415 (1998-1999), Sénat – Office Parlementaire D'Evaluation des Choix Scientifiques et Technologiques, Paris.
- Mosca, M, Sanzini, E & Aureli, P 2006, 'Le acque minerali naturali: come non perdersi in un bicchiere d'acqua', *Notiziario dell'Istituto Superiore di Sanità*, vol.19, no.10, pp.11-14.
- Olson, ED 1999, *Bottled Water: Pure Drink or Pure Hype?*, National Resources Defense Council- NRDC Publications Department, New York.
- Pavan, A 2008, *L'amministrazione economica delle aziende*, Giuffrè, Milano.
- Raftelis, GA 1993, *Comprehensive guide to water and wastewater finance and pricing*, Lewis Publishing, Boca Raton.
- Royte, E 2008, *Bottlemania*, Scribe Melbourne, Melbourne.
- Rosenthal, E 2009, 'City Known for Its Water Turns to Tap to Cut Trash', *New York Times*, 11 June, pp 8-12 .
- Samek, K, Land Use, J & Env'tl, L 2003, *Unknown Quantity: The Bottled Water Industry* Florida's Springs, HeinOnline, New York.
- Shiklomanov, I 1998, 'World Water Resources a new appraisal and assessment for the 21st century', paper presented to the International Hydrology Programme, Paris, November 1998.
- Spar, D & Bebenech, K 2008, 'Profitable Spring: the rise, sources and structure of the bottled water business', *Enterprises et histoire*, n.1, pp.100-118.
- Spethmann, B 1994, 'The mystique of the brand: jarred, bagged, boxed, canned; a brand's equity protector is the package itself', *Brandweek*, vol. 35, no. 26, pp. 25-26.
- Som, R 2008, Bottled water packaging, *Packaging*, no. 2, pp. 8-29.
- Strang, V 2004, *The Meaning of Water*, Berg, Oxford.
- Taylor, D 1997, *The French Revolution*, Jordan Hill, Heinemann, Oxford.
- Trentmann, F & Taylor V 2006, *From Users to Consumers: Water, Politics in Nineteenth-Century London*, in Trentmann F. (ed.), *The Making of the Consumer: Knowledge, Power and Identity in the Modern World*, Oxford, pp. 53-80.
- Underwood, RL 2003, 'The communicative power of product packaging: creating brand identity via lived and mediated experience', *Journal of Marketing Theory & Practice*, vol. 11, no. 1, pp. 50-62.
- Wilk, R 2006, 'Bottled Water: The pure commodity in the age of branding', *Journal of Consumer Culture*, vol. 6, no. 3, pp. 303-325.