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LESOTHO'S WHITE GOLD: A POTENTIAL SOURCE FOR VIRTUAL WATER TRADE

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Abstract

In literature, the significance of virtual water trade takes many different shapes. In order to increase regional water use efficiency and attain water security in water-scarce regions and/or countries of the world, virtual water trade among nations and even continents could be utilised as a tool. The economy, diplomacy, and internal and international food security are all benefited by Lesotho's water resources. One of Lesotho's most precious resources, water, makes a significant contribution to the country's prospects for long-term, sustainable economic development. In a setting with significant natural climatic volatility, the World Bank determined that improving water security will be crucial to meeting future demand. Water is widely considered as "white gold" in Lesotho. Water is abundant in Lesotho, a blessed nation. Given its plenty of water and low present water consumption, Lesotho is unlikely to develop either water stress or scarcity in the foreseeable future. Thus, there is still opportunity for expanding water use as a source of income, including virtual water trading. Lesotho needs to take into account the water and food shortages in the water-scarce Gulf region and the idea of virtual water trade, which has significant social, economic, and political advantages. The aim of this paper is to assert the importance of Lesotho's abundant water resource to the global political and economic landscape, and the discourse of virtual water trade. While countries are minimising their direct or indirect water use of producing strategic agricultural and industrial goods, Lesotho can make use of this situation in order to maximise revenue.

Keywords: Lesotho. Water. White Gold. Virtual Water Trade

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1. General Introduction and Orientation

Water is a finite resource and unlike oil, water cannot be replaced (Zygmunt, 2007:4). According to Zhao et al. (2019:304), the study is informed by the well-known "virtual water[41] theory," which postulates that importing water-intensive goods from water-abundant regions or nations could help water-stressed or water-scarce regions or countries.

Virtual water trade has drawn more attention due to the fact that the majority of the world's water consumption is used for food production, the water content of agricultural products, as well as the volume of water that travels across international borders through agricultural trade. The "water-food nexus" refers to this connection between the issues of agricultural trade, food security, and water scarcity (Allan, 1998:545). Our water footprints are much larger than we can possibly fathom and go far beyond the borders of our own country.

The global exchange of goods has made it possible for nations with few water supplies to rely on the water supplies of other nations to meet their population's demands. Food and other things that are traded globally have a virtual water footprint with them. The idea that countries might conserve local water by importing food was given the name "virtual water commerce." The term "water footprint" was first used by Arjen Y. Hoekstra in 2002 to describe the relationship between consumer goods or a consumption pattern and water use and contamination (Godfrey and Chalmers, 2012:222). The globalization of water can be understood as a larger narrative that includes virtual water trade and water footprints. These decisions and their interdependencies can be clarified by looking at the water footprint and translating it into virtual water. We can better

[41]The virtual water concept, also known as embodied water, was coined by John Anthony Allan (Tony Allan) in 1993. He received the Stockholm Water Prize for this innovative concept late in 2009.

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comprehend how dependent on other people's resources our economies are by using virtual water (Water Footprint Network, n.d).

Virtual water trade occurs g among nations when things requiring a lot of water are imported and exported by others (Hoekstra and Hung, 2002). In order to comprehend how countries with limited water resources could feed their citizens with food, clothing, and other water-intensive items, the notion of virtual or embedded water was initially established (Water Footprint Network, n.d.). The virtual water viewpoint was first put forth as a plan for nations with water shortages to import goods that use a lot of water and are made in countries with plenty of water to lessen their current water stress (Zhao et al, 2019:304).

Hoekstra and Chapagain conducted the largest investigation of embedded water to date in 2004. Numbers used in this Briefing, unless otherwise noted, are taken from the Hoekstra and Chapagain report. Contrary to earlier research on embedded water in crops, this one was primarily concerned with agricultural products and considered both irrigation and soil water. Water used to make feed, care for the animals, and provide drinking water for the animals were all considered in the study for animal products (Zygmunt, 2007:10). The idea of virtual water commerce has gained atraction recently in both the scientific and political debates. In literature, the significance of virtual water trade takes many different shapes (Matchaya, 2019:35).

By determining how much water is needed to produce goods and services at the river basin, regional, national, and global scales, extensive research and studies[42] have approximated virtual water flows (Zhao et al, 2019:304). Similar to this, some of these researches have discovered that water-scarce nations export water-intensive items, whereas water-abundant countries frequently import water-intensive products as a result of the dominating influence of other factors, including

[42]Chapagain and Hoekstra, 2008; Feng and Hubacek, 2015; Feng et al., 2012; Guan and Hubacek, 2007.

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land endowment, labor costs, and institutions (Zhao et al, 2019:305). For instance, a number of nations largely depend on foreign water supplies (Mexico, for instance, imports virtually all of its water needs from the US) (Mekonnen and Hoekstra, 2011:5).

By importing goods that use a lot of water and exporting goods that use a little water, many countries are able to conserve their local water supplies. Virtual water can be imported and exported by countries through their trading links internationally (Water Footprint Network, n.d.).

2. Virtual Water Trade: Importing Water-Intensive Products

A fresh, enlarged viewpoint on water issues is made possible by virtual water trade: It permits the differentiation and balancing of various views, fundamental conditions, and interests in the context of recent advancements from a supply-oriented to a demand-oriented management of water resources. Analytically, the concept makes it possible to separate global, regional, and local levels, as well as their connections. This indicates that if water resource issues cannot be effectively resolved in the local or regional watershed, they must be resolved in problems. Thus, virtual water trading can get beyond a narrow watershed view's hydro-centricity. According to the conference's proceedings from 2006, it makes sense to connect the new idea with the integrated water resources management strategy (Allan, 1998:545; Earle, 2003:230).

The concept of the virtual water trade is unclear. Its shifting between an analytical, descriptive idea and a politically motivated tactic is the source of this uncertainty. Virtual water trade, as an analytical notion, is a tool that enables the identification and evaluation of policy solutions in both the scientific and political discourses. The topic of whether virtual water trade can be implemented sustainably as a political ploy, if it can be handled in a socially, economically, and environmentally sound way, and for which nations, the notion offers a viable alternative (Berrittella et al, 2007:1780).

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The idea of "virtual water commerce," developed by Tony Allan, refers to the concealed movement of water that occurs when food or other commodities are exchanged from one location to another. The volume of freshwater utilised to manufacture a product, as measured at the location where the product was really produced, is what Hoekstra refers to as the product's "virtual-water content." For instance, to produce one metric tonne of wheat requires 1,340 cubic meters of water (based on the global average). Agricultural practices and climatic factors can affect the precise volume (Hoekstra and Chapagain, 2007:35–48). Virtual water, embodied water, and shadow water are other names for "embedded water" (Merrett et al. 2003:4). The amount of water needed to make a good from beginning to end is referred to as embedded water (Hoekstra 2003:13). Most often, embedded water is employed in relation to agricultural crops (Zygmunt, 2007:10).

The water utilised to create a good is referred to as embedded water. Jordan and other countries with limited water supplies import a lot of products. Nations with limited freshwater resources could reduce strain on those resources by importing products with high embedded water contents, relieving them of the burden of having to use their limited water resources to make those products. Thus, alongside the nation's water resources, water contained in products could be considered an additional water source. An unevenly distributed natural resource could be redistributed through global commerce (Zygmunt, 2007:9).

The amount of water used in the manufacturing of a product (a commodity, good, or service) is referred to as its "virtual water content." The amount of water embedded in traded goods is represented by the term "virtual-water commerce." Every product made from crops contains water since it is a necessary component for crop cultivation (Matchaya, 2019:31). It can occasionally be appealing for countries with limited water supplies to import "virtual water" (via the import of products that require a lot of water), easing the strain on domestic water supplies. This occurs, for instance, in Mexico, the Middle East, and Mediterranean nations (Water Footprint Network, n.d.). Virtual water is heavily imported by nations in northern Europe. China's northern, water-scarce

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regions export their water-intensive commodities, while the southern water-abundant regions import them (Zhao et al, 2019:305).

The concept behind the virtual water trade is that when products and services are traded, so is virtual water. One tonne of wheat imported from outside saves 1,300 cubic meters of genuine domestic water when produced domestically. If there is a water shortage in this nation, the "saved" water can be put to other uses. However, if the exporting nation lacks sufficient water, it has exported 1,300 cubic meters of fictitious water instead because the actual water required to grow the wheat won't be available for other uses (Earle and Turton, 2003:184; Berrittalla et al, 2007: 1799).

Only one-quarter of the world's rainfall falls in the regions where two-thirds of people reside. Additionally, 40% of the world's population today resides in regions with a water shortage. By 2025, experts project that this number will increase to between 50 and 65%. (Zygmunt, 2007:9). Two-thirds of the world's population is anticipated to reside in water-stressed regions by 2025, with over 1.8 billion people living in places with severe water shortages. Virtual water trade (i.e., exporting and/or importing water-intensive goods) could help with a portion of the issue (Mokhethi, 2016).

While it takes roughly 1000 litres of water to generate 1 kilogram of wheat, it takes about 15 times as much to make 1 kilogram of beef! This is because animals that also drink water are fed crops that were grown using water. In addition, water is needed to care for cattle. Because of this, the inherent water content of meat and dairy products is invariably larger than that of most crop products. More water gets ingested into our food as it moves up the production chain. The largest consumer of water among all important crops traded worldwide is rice. 1359 billion cubic meters of water a year, or about 21% of the total volume of water utilised for crop production, are used in the production of rice worldwide. Wheat is the second-largest water absorbent. Wheat consumes

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roughly 793 billion cubic meters of water yearly, or 12% of all crop water use worldwide (Zygmunt, 2007:10-11).

For example, water-scarce nations like Israel forbid the export of oranges (relatively water-intensive crops, such as oranges, wheat, rice, etc.) in order to stop massive water exports to other nations. If the flow is from locations with relatively high water productivity (i.e., commodities with a small water footprint) to locations with low water productivity (i.e., commodities with a large water footprint), then national water savings through the import of a product can also mean global water savings (Water Footprint Network, n.d.).

It may be more advantageous for countries with limited water resources to import items than to produce them. Considering the investment requirements for the necessary infrastructure which may need to be created over thousands of kilometers to distribute the water, trading water directly may be prohibitively expensive and demanding. When a region or country exports a product that requires a lot of water to another region or country, water is exported virtually. In this way, certain countries and regions assist other countries and regions with their water demands (Matchaya, 2019:32).

A nation exports virtual water when it sends a product that requires a lot of water to another nation. It might be more appealing for countries with limited water resources to attain water security by importing water-intensive goods than producing all water-demanding goods domestically (Matchaya, 2019:31-2). A nation may decide to import water-intensive goods to lessen the strain on its domestic natural resources (Water Footprint Network, n.d.). Lesotho's substantial water resources become crucial and pertinent to the discussion around the virtual water trade as a result of this load. When a nation exports agricultural products that use huge amounts of water in their manufacturing process, the water used in those processes is said to be exported virtually since it is taken away from domestic use. By saving the water that would have been needed to generate the

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imported items domestically, the importing country in turn purchases water virtually (Gawel and Bersen, 2011:3).

Worldwide, the top exporters of gross virtual water are the United States, China, India, Brazil, Argentina, Canada, Australia, Indonesia, France, and Germany, while the top importers are the United States, Japan, Germany, China, Italy, Mexico, France, the United Kingdom, and the Netherlands. The United States, Canada, Brazil, and Argentina are the major net exporters of virtual water, followed by India, Pakistan, Indonesia, Thailand, and Australia in Southern Asia. North Africa and the Middle East, Mexico, Europe, Japan, and South Korea are the top net virtual water importers (Water Footprint Network, n.d.).

National policy makers in nations with limited water supplies are probably more interested in domestic water savings than international water savings. There are numerous instances of water-scarce nations conserving their indigenous water supplies by importing products that need a lot of water. For instance, Mexico saves 12 billion cubic meters of its own water resources annually by importing corn. This is how much water would be required domestically to produce the imported maize in the nation (Water Footprint Network, n.d.).

By importing goods that require a lot of water rather than producing them at home, a nation can protect its domestic water supplies. The SADC countries that are arid or semi-arid and have limited water resources, little investment in water development, and variable rainfall patterns should take particular note of this. However, there is little research in this field in southern Africa (Matchaya, 2019:32). The Middle East and North Africa (MENA) region's desert nations, which lack enough water supplies to feed their populations and heavily rely on imports of food, are the environment in which the concept of virtual water was originally addressed. As a result, virtual water has taken on political significance since it helps governments in these nations to protect their limited water resources and might even, as is sometimes stated, prevent conflicts over water (Allan 1998:546).

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Major food exporters like Argentina, Australia, and the United States are significant net virtual water exporters; whereas major food importers like Japan, North Africa, and Europe are large net virtual water importers, according to estimates of virtual water flows (Mekonnen and Hoekstra, 2011; Zhao et al, 2019:304). Only around 15% of the crops grown worldwide are irrigated; the remainder are dependent on natural rainfall. However, the Food and Agricultural Organization of the United Nations predicts that irrigation will continue to play a significant role in the production of food globally over the next few decades, accounting for 70% of all freshwater withdrawals worldwide (Zygmunt, 2007:8).

Industrial and domestic withdrawals pale in comparison to the need for freshwater in agriculture. Only about 20% of freshwater withdrawals worldwide is made for industrial purposes, and only about 10% are made for domestic use such as drinking, cleaning, cooking, and flushing the toilet. Agriculture is a major abstractor on a global scale, but sector utilization at the country level varies greatly (Zygmunt, 2007:8).

If all agricultural items imported were produced domestically, the importing nations would have needed 2 407 billion cubic meters of water annually. However, these items only require 2 038 billion cubic meters of water per year to create in the exporting nations, saving 369 billion cubic meters annually (Mekonnen and Hoekstra, 2011). This savings is equal to 4% of the annual 8 363 billion cubic meters of water used for agricultural agriculture in the world (Water Footprint Network, n.d.).

3. Lesotho's Water as a Potential Source for Virtual Water Trade

Countries with an excess of water resources could profit by exporting water-intensive goods. Due to the great distances and accompanying expenses, trading real water between water-rich and water-poor places is typically not feasible. However, trading water-intensive goods (virtual water trade) is feasible. In order to increase regional water use efficiency and attain water security in

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water-scarce regions and/or countries of the world, virtual water trade among nations and even continents could be utilised as a tool (Shi et al, 2014:1349).

Even though Lesotho is a landlocked nation, water plays a significant role in the country (Emenanjo, 2018). Lesotho is one of a select group of enclave landlocked states[43] in the world, along with the Vatican and San Marino, both of which are located in Italy. Lesotho is completely surrounded by South Africa and is bordered on the east by Natal, the south by the Cape, and the west and north by the Free State (Sohn and Gustafson, 1984:129; Lundahl et al., 2003:3). (see. Map 1).

The water resources of Lesotho have advantages for the country's economy, diplomacy, and local and international food security. Trade may make it easier to supply water-intensive commodities to dry countries, reducing the strain on their water supplies. Even while there may be chances for action on a global scale, Lesotho itself has many chances. So goes the old adage: think globally, act locally.

[43] States that are entirely surrounded by a territory of only one other State (Uprety, 2006:405).

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Map 1: Map of the Kingdom of Lesotho (Maps of World, 2017).

Lesotho, which is surrounded by South Africa, might produce income through regional transfer schemes due to its closeness to important demand centers in the area, as well as its altitude and high-quality water resources. The water-rich mountains of this landlocked nation allow the water sector to contribute around 10% to GDP (GDP). Since 1996, the Lesotho Highlands Water Project

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(LHWP) has generated consistent earnings of around US$800 million and enabled investments totalling more than US$3 billion. To balance the development of water resources for export with the national aim of enhancing domestic levels of access and supply to agricultural, industrial, and commercial sectors, however, has proven to be difficult for Lesotho (World Bank, 2016). Additionally, given the nation's rapidly accelerating population expansion, Lesotho must transit to virtual water trading in order to achieve its socioeconomic goals. Additionally, Lesotho exclusively obtains royalties from the selling of its waters to South Africa, which is its sole client for cash. In order to generate profit from its water resources for the constantly expanding population, the scope must be expanded.

At the heart of the Mountain Kingdom of Lesotho lie the highlands. Sitting between 2000 and 3500 metres above sea level, they channel water into the Orange-Senqu River, which originates in Lesotho and flows through South Africa, Namibia, and Botswana. The river has tributaries that extend as far as Botswana. The most economically active region of Southern Africa relies on it as a major source of water for large-scale agriculture, industrial production, hydropower, urban demand, and small-scale rural activity. The majority of South Africa's water is used by its highly developed economy, with Gauteng receiving almost 32% of its water straight from Lesotho (ORASECOM and Lesotho Department of Water Affairs, 2018:1).

Lesotho, which is located in the Orange-Senqu River basin, has a lot of water resources (Emenanjo, 2018). Lesotho accounts for more than 40% of the Orange-Senqu Basin's yearly runoff despite making up only 5% of the basin's overall area (ORASECOM and Lesotho Department of Water Affairs, 2018:1). South Africa is the largest water user among the Orange River riparian states, using around 63% of the river's total annual flow of 11,300 million cubic meters. With a large reliance on groundwater, upstream Lesotho withdraws only 0.2% of the water, while downstream Namibia consumes only 1.3% of the water (Meyer, 2013:28).

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Additionally, the basin is home to nearly the entire 2.1 million-person population of Lesotho (Country Meters, 2016). (Jacobs, 2009:98). Significant water resources provide enormous benefits to Lesotho (Sullivan, 2014: 194–5). One of Lesotho's most precious resources, water, makes a significant contribution to the country's prospects for long-term, sustainable economic development. Improving water security will be crucial to satisfying demand in a setting with significant natural climate volatility, according to a World Bank study (World Bank, 2016).

Senqu River Basin, Mohokare River Basin, and Makhaleng River Basin are the three hydrologically homogenous river basins that make up Lesotho (Thibankhoe, 2019). Additionally, there are three significant reservoirs: the roller-compacted concrete Metolong dam, the concrete faced rock-fill Mohale dam, and the double curvature arch Katse dam on the Malibamato River (Thibankhoe, 2019).

Water is widely considered as "white gold" in Lesotho (Thibankhoe, 2019). A lot of water is present in the nation of Lesotho (Mabula, 2018) Lesotho's overall water use is thought to be around 2 m3/s (cubic meters per second), although its total supply is only 150 m3/s. The least fluoride-containing still water is that from natural springs in Lesotho. Additionally, it is claimed that the water from Lesotho's highlands has a low sediment level and is of good quality, but much of it loses quality when it runs through South Africa and into the Atlantic Ocean by the Senqu/Orange River (Mokhethi, 2016). Numerous wetlands, or "sponges," in the highlands delay the flow of flood waters and collect, treat, and store rainwater so that it can be released gradually throughout the year (ORASECOM and Lesotho Department of Water Affairs, 2018:1).

Water covers over 70% of the earth's surface, and 97 percent of it is considered to be salty and unusable for drinking or irrigation of crops. However, Lesotho has an abundance of this resource (Mokhethi, 2016). Given its abundance of water and its present low water usage, Sullivan (2014:195) points out that Lesotho is not anticipated to encounter either water stress or scarcity in the foreseeable future. This indicates that there is still space to expand the use of water for

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generating cash, including virtual water trade, particularly with the Gulf states. Lesotho needs to take into account the water and food shortages in the water-scarce Gulf region and the idea of virtual water trade, which has significant social, economic, and political advantages. The greatest threat to environmental and human security in MENA is water scarcity, which is ranked second only to food security (Moshashai, 2019).

The import of food, including the sometimes overlooked import of artificial water, is very important to the Gulf. Gulf states export virtual water to their neighbors as well as importing it in foods from far-off regions including Europe, Australia, India, the United States, and Latin America (Obeid, 2020). Lesotho can benefit from the fact that no goods are imported from Africa. Lesotho will be able to establish a solid feeling of social, economic, and political power in the area and on the continent.

The region has the lowest ratio of renewable water resources per capita in the entire globe, making it the most water-stressed. By 2050, the World Bank predicts that the region will lose 6–14% of its GDP due to water scarcity (Obeid, 2020). The difficulty is greater due to the Gulf's arid climate, which will be made worse by climate change. The World Resources Institute reports that in terms of signs of extremely high water stress, Qatar ranked first in 2019, whereas Kuwait and Saudi Arabia came in at positions 7 and 8 respectively. The other Gulf States were among the top 16 nations (Hofste et al, 2019). Given the scarcity of water, it is essential that the Gulf's food security initiatives take into account how much water a product contains to determine where it should be produced and how to effectively utilize this priceless resource.

In the Gulf, the UAE and Saudi Arabia export food at the highest value; while Qatar and Bahrain export food at the lowest value. Saudi Arabia bought $16.2 billion worth of food products in 2017 and exported $1.6 billion worth (Observatory of Economic Complexity, 2017). In contrast, the UAE imported goods worth $15 billion and exported goods worth $3.8 billion, including food, animal products, and vegetable products. The majority of food exports are sent to nations in the

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Middle East and the Gulf, such as Oman, Kuwait, Jordan, and Lebanon, as well as to African nations like Sudan and South Africa (Obeid, 2020).

Oman sells wheat that requires a lot of water to Saudi Arabia and Qatar. Russia, the world's leading supplier of wheat, stated in mid-April that it would halt the shipment of most crops, including wheat, until June. The UAE and Qatar purchase wheat from Russia (Devitt, 2020). Saudi Arabia made major investments in domestic wheat production up until 2016, when it ended the initiative due to excessive water demand that put strain on the nation's groundwater supply. The kingdom is currently concentrating on silos; it has a 3 billion ton storage capacity for wheat and a manufacturing capacity of 15,150 tonnes per day, while the stock of flour is made up of 1.8 million 35 kilogram bag containers (Obeid, 2020). As a result, concentrating on Lesotho provides a good insight and a place to start when discussing developments in the agricultural virtual water trade.

4. Findings and Concluding Remarks

4.1. Findings

On one hand, global socio-economic developments that affect local water use, like trade patterns or urbanization, raise the need to address issues of water depletion and pollution in the context of global water governance (Pahl-Wostl et al. 2008:421), climate change or cause-and-effect relationships between, for example, deforestation in one region and changed precipitation patterns in other places are equally named on the other hand (Pahl-Wostl et al. 2008:421). Water is considered to have become a "global geopolitical resource," allowing exporting nations to impose their own political goals on the importer due to the rising dependence of countries with water scarcities on virtual water imports (Hoekstra 2006:19). Poor investment and growth in water infrastructure makes water shortage and the concept of virtual water trade problematic, if not impossible (Matchaya, 2019:32). Agriculture import and export decisions are influenced by a variety of factors, including labor, land, capital, and various production technologies. These factors are also significant determinants of comparative advantages (Gawel and Bernsen, 2011:19).

4.2. Concluding remarks

International collaboration on water resources can result from interdependence. We might be able to work together to improve the world's water use efficiency once people and countries begin to consider the amount of water included in every product. Regional water transfers will offer significant revenue sources to promote economic growth and poverty reduction. Water infrastructure that can enable increased irrigated agriculture and improve food security and rural possibilities should be developed for multiple purposes. Consistent investments are essential to support data collection, analysis, and the knowledge that is needed to guide investment planning and inform policy decisions (World Bank, 2016). There is a clear need for a global governance system since virtual water trade will always result in problematic circumstances. This is done by realigning virtual water flows with ideas of fairness and efficiency (Gawel and Bernsen, 2011:15).

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