

# The role of Information Technologies in improving Universal Access to Clean Water

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## **Abstract**

It is a universal human right to have access to clean water; yet 780 million people lack access to safe water. This is a governance issue that can be solved with Information Technologies in combination with Innovation Management. Scientists warned about limits to growth more than 40 years ago, yet we decoupled our currency conversion to gold – unleashing an unprecedented growth, which has made it challenging to make a smooth transition towards the adoption of sustainable practices. Integrity Management in the form of a supplement to traditional retirement savings built on the foundation of successful aging of the healthy brain – enable a new form of pension characterized by proper diet, adequate exercise, challenges, newness and basic human love. Brain research on longevity combined with the concept of Time Banks applied to the world of volunteering with focus on Universal Access to Clean Water, is a new combination that might accelerate the transition towards a more sustainable economy. Clean Water Scarcity has many challenges, but also possibilities, so that a well executed Innovation Management strategic plan by a social entrepreneur might result in the shift from an oil economy to a clean water economy for an entire country and provide much needed hope that we will be able to reduce our dependency on fossil fuels as well.

## **Keywords**

Information Technology, Volunteering, Clean Water Governance, Retirement Savings Plan, Time Banks, Higher Education

## **Introduction**

Access to clean drinking water is a universal human right, central to human wellbeing and development. Better access to water and sanitation facilities can reduce poverty, provide health benefits, create business opportunities and financial growth. It's estimated that nearly 780 million people (Gleick, 2014) lack access to safe and improved water sources. There are several global initiatives which are addressing the issue of access to clean water like World Water Vision by World Commission, Vision 21 by Water Supply and Sanitation Collaborative Council, Water for Life by UN, Water Quality and Health Strategy by WHO, Water.org and more (Mehta, 2000; Zehnder et al., 2003). These initiatives around water show that there is an international concern about water issues. We've yet to see a war break out due to lack of water and food, but scientists warn about water scarcity and with our growing issue of climate change it is just a question of time before we start seeing water wars (Buu, 2010; Okur-berberoglu, 2014). Over the past sixty years, a number of efforts have sought to address the many challenges facing the water sector. Early efforts to address these challenges were almost entirely based on developing physical infrastructure. There was a growing recognition that technology and infrastructure were not sufficient and a discourse about governance began to emerge in the early 1990s. The World Water Development Report (United Nations, 2003) stated that the water crisis is essentially a crisis of governance. It is not only national governments that have to relate to these challenges, but multinational companies as well (Gleick, 2014). How can Information Technologies in combination with Innovation Management be utilized in business and higher education to resolve this crisis of governance?

## **Information Technologies**

For centuries systems has been put in place for various reasons, it being to maintain power or for a religious motivation. The industrial revolution decoupled us from agriculture and gave rise to complex systems in cities. In 1971 the Bretton Woods system was terminated, ending the ability to convert US dollar to gold. The next year researchers warned us about the limits to growth (Meadows et al., 1972), urging for early adoption of sustainable practices to allow for a smooth transition. The opposite happened, as decoupling of the US dollar also decoupled our economy to limited natural resources causing a dramatic population growth measured in absolute numbers. Information technologies and more women entering the workforce gave a significant growth in productivity, without much consideration given to the fact that we just borrow this planet from the next generation and that an obsession with short-term profit maximization will deplete natural resources. In this hopeless development (Randers, 2012) the BitCoin appears in 2009 as a distributed currency

that made a lot of geeks rich, as the market cap within a few years grew to several billions of dollars. At the core there were an invention called BlockChain, which is a secure wallet that can store any type of coins - not just crypto-currencies. A solid foundation for introducing the WaterCoin exists already; with the challenge not being related to what are technically possible - but rather how to properly conduct the Innovation Management.

## **Innovation Management**

It is established that the water crisis is actually a crisis of governance. Innovation Management relates to governance. Doing the right thing even when nobody is looking can be defined as having integrity. So to solve the water crisis, we need to design, develop and deploy a system for life planning with focus on integrity. This never-ending process is called Integrity Management and requires great attention to innovation in order to keep costs down and to stay aligned with current developments. United Nations declared in 2010 that access to clean water is a human right, 62 years after The Universal Declaration of Human Rights, yet close to a billion people lack access as a result of poor integrity among the vast majority of organizations with the resources to make a difference.

Joseph A. Schumpeter stated in his first publication (Schumpeter, 1912; Sandal, 2003) that a single entrepreneur initiates innovation. Being able to combine land and labor in a way that previously was not possible or not as efficient as before. The entrepreneur obtains capital and is able to realize the means of production. The entrepreneur must develop the ability to see trends, use his intuition, be able to persevere resistance, have freedom from everyday activities and maintain enough staying power. The entrepreneur must be able to imagine the possible results of the inputs. Personal management through development of stamina, flexibility, ability to take initiative, abstract thinking, the ability to be assertive without being perceived as arrogant, develop compassionate and nurturing skills of a leader, while at the same time being grounded and not losing touch with our otherwise harsh reality. Innovation Management is the activities the entrepreneur do in order to move an idea to realization. Without any knowledge of management or ability to manage the entrepreneurial activities, the innovation may not be realized (Trott, 2008).

Integrity Management is best achieved if incentives are tied up to a long-term goal, like a retirement celebration anywhere in the world at age 67 with fireworks at the exact birth time for members of this optional pension savings program. Currently, the pension system in Norway is designed for citizens to earn a decent retirement through more than 40 years of employment. We know that the marginal value of money with respect to happiness is limited (Diener et al., 2004), and brain research on longevity show that maintaining an active lifestyle is important also after retirement. Prof. Marian Diamond (88) presented at the “Conference for the American Society on Aging and the National Council on the Aging” a paper titled “Successful Aging of the Healthy Brain” (Diamond, 2001) – in which she outlines 5 factors to Healthy Living: “Number one, and in my mind the most important, is DIET. What we feed this brain is a significant factor in its well-being. Two, is daily EXERCISE, and that applies to the brain as well as the body. Exercising the total body serves to maintain a healthy brain. Three, we must CHALLENGE the brain. It gets bored; we know that well. Four, we need NEWNESS, new pursuits, new ideas, new activities in our life. And five, last but definitely not least, we must nurture ourselves and each other: call it sharing basic HUMAN LOVE.”

The WaterCoin positioned as a supplement to traditional retirement savings, designed on the basis of tracking hours of volunteering efforts, will then be utilized at age 67 so that the coins are passed on to other volunteers engaged in care for the elderly. To ensure successful aging of the healthy brain, trips to areas affected by natural disasters will be organized for those retired to engage in volunteer tourism - with focus on volunteering during weekdays and excursions to local scenic destinations in the weekends. WaterCoins will reward a heavy discount for these trips, which require a minimum of 10 hours average monthly volunteering for 40 years prior to age 67. Those who clock in 30 hours a month will earn the maximum amount of coins.

## **Time Banks**

The concept of using time as a currency has been around since the early 19th century. Time Banks have been established in 34 countries, with at least 300 Time Banks established in 40 states across the US and 300 throughout the United Kingdom. Time Dollars are a tax-exempt complementary currency in the US. Time banks have the potential to become powerful tools for overcoming social exclusion and enabling community self-help (Seyfang, 2003; Seyfang, 2004; Seyfang, 2006). A startup called TimeRepublik have since 2012 developed a global Time Bank to eliminate geographical limitations of previous Time Banks, without having experienced much success. Applying the concept of Time Banks to the world of volunteering as a way to supplement traditional retirement savings, focused on Universal Access to Clean Water, is a new combination that has yet to be applied in the market.

## **Pension Funds**

As interest rates are dropping all over the world and growth rate is slowing down globally, pension funds are forced to expand their investment universe and diversify their portfolio. The Government Pension Fund Global with a portfolio value of about 7000 billion NOK was instructed in 2009 to start investing 5% of the fund in real estate. Five years later 2% has been invested in real estate. The Government Pension Fund Norway is restricted to invest in Nordic countries with a portfolio just below 200 billion NOK, having recently started a process that might open to investments in infrastructure and real estate – in addition to stocks and bonds. With successful aging of the healthy brain requiring an active lifestyle filled with a proper diet, adequate exercise, challenges, newness and basic human love – it makes perfect sense for a pension fund to invest nationally and globally in physical, organizational and digital infrastructure which allow for an active retirement and meaningful volunteering. Recent regulatory changes also open up for active involvement of pension funds in this shift towards a more modernized form of retirement, which reward individual triple bottom line behavior.

## **The role of Higher Education in Society**

It has been said that the future is being created at Universities, which doesn't help much if all new inventions are to be commercialized and end up with a fiduciary duty of maximizing profits either through an IPO (Initial Public Offering) or through an acquisition by a publicly listed company. Politicians and professors close to retirement are also biased in the governance of the WaterCoin. Students in Higher Education making decisions for an Information Technology that is relevant for themselves at age 67, are on the other hand suited for such responsibility. The water crisis is a crisis of governance, which requires students with a strong sense of integrity to be in charge. Some undergraduate and graduate students will get involved in the continued developed of the WaterCoin as a reliable and trusted protocol post graduation, which are then required to lobby to current students for any changes to the protocol they find to be necessary.

## **Clean Water Scarcity - The challenges**

Water is a renewable resource that has a temporal cycle in the world. It is important to differentiate between "real" and "manufactured" clean water scarcity. Real scarcity is an environmental and social problem with biophysical and social manifestations. Scarcity can also be manufactured both due to anthropogenic interventions and due to discursive constructions (Mehta et al., 1999). Environmental problems can be natural disasters and climate change like the earthquake in Haiti January 2010 where 220 000 people died and 1,5 million people had to live in shelters. Water was scarce. Social problems can be water shortage in water tanks, decaying pipes and leaks from the sewage system into the water system (Lee et al., 2005). In 2011 in a single neighborhood in Mexico City, 60.000 inhabitants had their homes inundated by "the great black flood". It's estimated that more than 40% of the water that flows through the different water system under Mexico City leaks out (Tortajada, 2003; WWF Germany, 2011).

From early civilizations man made constructions has made an impact on land and water. Constructions like reservoirs and dams. Water governance began to emerge in the late 20th Century to address man-made interventions but have had both positive and negative effects. Yemen is an example on a country where the use of groundwater is four times that of natural recharge (Briscoe, 1999; Shah et al., 2000). Different incentives have been created to meet water challenges in Yemen, such as funding and access to research and governance models, but little has been done (El Haouari et al., 2011). There are also increasing anthropogenic interventions; actions mainly from corporations to harvest resources from land and sea like for instance agriculture, mining, meat production and irrigation projects.

## **Clean Water Scarcity - Possibilities**

Water has in the developed world become such an accessible commodity that people take access to clean water for granted. It is therefore challenging to develop business models, which harness the full potential of allocating resources where the need is. In a world where crypto-currencies (BitCoins) develop into a multibillion dollar market in just a few years, where computer enthusiasts happily multiply the size of their electricity bill in hopes of applying computer power to mine "Coins" which fluctuate greatly in value - then time is also prime for replicating a similar system for adopting enthusiasm and excitement for a financial innovation centered around water filtration systems around the world. Not just the developing world, but also the developed world - making healthy water accessible to environmentally conscious consumers who have developed a distaste for the negative impact of bottled water.

Freemium, the blend between premium and free, is a simple business model in which 1% pays and the remaining 99% enjoy the service for free - a model which fits perfectly with our current wealth distribution globally. By installing water purification systems in the developing world, tourists from the developed world can access an environmentally friendly option to buying bottled water while being confident that the water is safe to drink proper development of a global brand. Tourists will have the ability to find nearby locations through an app ([www.Water.Gift](http://www.Water.Gift)), which even feature an up-to-date list of mineral content with a comparison with bacteria level of bottled options in the area. Similar dispensary machines exist already ([www.VyyknWater.com](http://www.VyyknWater.com)) with locations in the US, Russia and Australia. A strategic advantage would be to form partnerships and uncover advantages of collaboration.

### **Clean Water Scarcity - Innovation Management Strategic Plan**

A solid strategy advice is to predominantly apply timing and the pull factor, instead of engaging in exuberant spending of resources in applying a push strategy. The limits to growth have been known since the 70s (Meadows et al., 1972), without the society as a whole having had much success in a smooth transition towards a more sustainable economy - as recommended. We are still discussing and negotiating for a binding global agreement. This is why social entrepreneurs are so important. With limited resources they educate themselves about challenges that the public care about, and through networking and a continuous effort are able to deploy solutions through the discovery of synergies between existing organizations as an independent agent (Svendsen, 1997). The more social entrepreneurs know about Innovation, Marketing, Management, Financial Control and Risk-ability, the more likely they are at obtaining desired success (Chen et al., 1998). A typical student at a private business school might for instance care about Clean Water for health reasons, as more readily access to Clean Water will reduce consumption of sugary beverages. While a typical student at a public university might be radically different, primarily concerned about the environmental impact of plastic needing 450 years to decompose and therefore be concerned of improving infrastructure of access to Clean Water. A social entrepreneur might be motivated by the global long-term impact with regards to both health and the environment, successfully improving local infrastructure with a differentiated approach at various markets while at the same time recruit and train local students that upon graduation can travel abroad to replicate the success.

Every year the public channel of Norway support a national donation day in collaboration with a non-profit promoting a particular cause. The campaign for 2014 was called "Water Changes Everything", setting a new donation record with the money going to Norwegian Church Aid. Norway has long traditions and a solid infrastructure for providing aid to the developing world, but there is a 6<sup>th</sup> element missing: The Social Entrepreneur with an Innovation Management Strategic Plan.

### **Clean Water Scarcity - Conclusion**

This individual (the 6<sup>th</sup> element) has a huge network both nationally and internationally, knowledgeable about challenges and opportunities on a national and macro-economic level - with the patience to follow through with a strategic vision, combined with the ability to adapt and grow upon discovery of new information and new discoveries, on a continuous path to a better strategic plan increasingly more innovative. The Social Entrepreneur operates as an independent agent experienced in uphill battles and is not put down by obstacles or slow progress. Being skilled in seeing trends and understanding macro-economic functions, this social entrepreneur is likely to have a solid understanding about how systems work and what can be done to bridge different interests to create win-win-win solutions through employment of hybrid models which act locally with a global mindset. Through new combinations of growing awareness around the ecological challenges of global warming, and the increasing concern of Clean Water Scarcity, the Social Entrepreneur will through skills in Innovation, Marketing, Management, Financial Control and Risk-ability create unique combinations of opportunities which are present and aligned with trend developments. A Social Entrepreneur is not motivated by making a Profit, but is rather on a mission to help People and our Planet, and will therefore with all likelihood reinvest success to strengthen possibilities for maximizing future impact. Persistent efforts might result in the shift from an oil economy to a clean water economy for an entire country like Norway, fueled by investments in fossil fuels that no longer being profitable and a growing public demand to take Climate Change seriously - so that we avoid the self-perpetuating runaway global warming nightmare at 3° Celsius temperature increase, giving the next generation a chance to survive.

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