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A New Concept Towards Addressing Our Pressing Development Issues through Innovation, Sustainability, and Social Entrepreneurship

(Case Studies: Building Infrastructure through Plastic Waste)

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Abstract

Nowadays, not only in Egypt but also globally, the job for life is no longer the norm^[1]. For this reason innovation became a must; not just a luxury or something that people or countries can deal with as a source of boasting or showing. Thus, and in order to promote sustainability concept through innovation, sustainability, and social entrepreneurship, this paper suggests some recommendations and introduces some solutions which can help in achieving and getting the most possible outputs and deliverable from the challenges are faced every day. It also proposes a new concept regarding the social entrepreneurship, social problems and development projects; e.g. infrastructure issues.

The concept assumes that we have to go through three different ways in parallel when solving our pressing problems. These ways include the benefit from: our previous experiences, others' successful applied projects, and the continuous follow-up of new technologies under development. Also, it addresses how those three elements can be connected in a sustainable way which ensures the sustainability and the effectiveness of improving them at the same time. In addition, it gives one or more examples in each channel to clarify the situation. Besides, the paper introduces some recommendations such as launching innovation & social entrepreneurship hubs, holding conferences & competitions and supporting R&D projects in order to promote our situation and consolidate our experiences.

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Keywords

Sustainability; Social Entrepreneurship; Innovation; Sustainable Development; Plastic Waste; Infrastructure

1. Introduction

Over the last few years, the magnificent change in the way people think, act, and go through the practical life -especially in the new generations- has shaped and formed new ways for how we can work^[1] and achieve our deliverable as countries and as individuals, too. This promoted the opportunities among the social entrepreneurs who aim at helping their countries solving their pressing social issues through coming up with new, innovative and

viable solutions. This can help them to solve those pressing needs by using the local resources, and the simplest techniques to ensure the sustainability of the applied solutions.

In Egypt, we need to spread the spirit of creating jobs; not just searching for this spirit among youth, inside our communities as a whole, or even inside our schools. That would help us improve our situation regarding social entrepreneurship and sustainability. ^[2]

Although we can learn from our mistakes and our previous experience, it is better to learn from others' experiences and to follow-up new innovative technologies under development around the globe. So we can benefit from it once it becomes reliable.

For those reasons, this paper addresses three new approaches or channels in dealing with the most important pressing issues we suffer from in the Developing Countries and specifically in Egypt. These approaches can be categorized into three different channels as follows: 1) benefiting from our previous experiences, 2) benefiting from others' applied solutions, and 3) continuous follow-up for new technologies under development.

An example concerning the first approach, "benefiting from our previous experience", is learning from a local experience by discussing an amazing Egyptian experience in the field of social entrepreneurship and environment called "Recycling the Rejects of the Rejected Plastics". While, the second approach, "benefiting from others' successful applied projects", can be illustrated via discussing some examples of globally successful applied projects. This can be achieved by discussing how we can benefit from the successful projects implemented by other social entrepreneurs around the globe. This paper presents four amazing examples which can help to solve infrastructure issues. The last approach, "continuous follow-up for new technologies under development", focuses on the advantages of investing in the R&D projects and the importance of tracing new innovative technologies like "PlasticRoad"; the very innovative solution towards building roads.

There are many untapped opportunities around us which can be the solutions for most of our pressing social and economic issues. But because of selecting the wrong methods to reach our destinations and achieve our deliverable, it becomes harder to face our challenges. In the light of this reason, this paper aims at helping us to follow the right ways and the most suitable channels by applying some recommendations to apply our solutions and move them from the problem phase into the opportunity phase. There are lots of great and innovative ideas around the globe regarding the construction and infrastructure projects. The most important aspect is not the issue of selecting the idea but selecting the technology that we use in our projects to solve our infrastructure problems in a sustainable and simple way.

For example, Egypt's population is a big concern as it is around 93 million and if it keeps with the same current birth rate, it will be 150 million by 2050.^[3] This significant challenge contains internally great opportunities such as the big amounts of solid wastes generated every day which can be recycled or even used to generate energy through "Waste to Energy" technologies. Also, providing the labor force with a high-quality capacity building process can be a catalyst for improving our economy and make it valuable, not a pressing issue. This can solve many problems and come up with new innovative ideas helping with our economy and attracting foreign investments rather than creating problems resulting from the unskilled labor force.

Moreover, Egypt produces 60 million tons solid wastes every day^[4]. These generated wastes not only cause environmental and social problems but also sometimes cause political issues and protest movements e.g. demonstrations in Lebanon in 2015 regarding waste-disposition crisis^[5]. One of the most important elements concerning the solid waste management is the plastic bottles as they need more than 450 years to decompose.^[6] According to Ellen MacArthur Foundation report in partnership with the World Economic Forum, by 2050 the plastic wastes in oceans will exceed fish in terms of weight.^[7]

On one hand, social entrepreneurship focuses mainly on solving social problems through innovative ideas. On the other hand, one of the biggest problems in Egypt infrastructure development projects which face many problems due to their big required investments. The following concept introduces a methodology on connecting these three elements: (Social Entrepreneurs, Social problems and development issues e.g. Infrastructure issues in a sustainable way).

In short, the cycle begins with studying the current situation and collecting all related solutions for the problems to be solved through the three shown channels. Then and after screening those solutions, we choose the best solutions to be implemented after making sure that the solution is viable, meets our requirements and is acceptable in terms of effectiveness and cost. Finally, we repeat the cycle after introducing new problems based on studying our current situations and so on.



Figure 1. TheProposed Concept

2. Examples for the Three Channels

2.1. First Channel: Benefiting from our Previous Experiences

Case Study: (Recycling the Rejects of the Rejected Plastics)^[8]

This solution can produce pavement tiles, bricks, manholes and many other products through recycling the rejects of the rejected plastics. This can solve a big social problem and also provide good sustainable solutions regarding some infrastructure issues. This project has already been implemented in Egypt by The Association for the Protection of the Environment (A.P. E) which is a non-profit organization.

The production process consists of four main processes; each process internally includes big opportunities for social entrepreneurs who aim at creating continuous value for their community through sustainable projects. The four processes are as follows:

1. Collecting the rejects of the rejected plastic and mixing them with sand,
2. Heating the mixture in a furnace up to 180 degrees Celsius,
3. Adding special dyes, and
4. Conducting hydraulic press.

Finally, coming up with the products as shown in figure 2. ^[8]



Figure 2. One of the final products from the project ^[8]

Regarding the first channel, this project not only can help in protecting the environment, but it can also assist in poverty alleviation through offering job opportunities for youth. [8] In addition, each step of the four processes of the project includes great opportunities for social entrepreneurs to make money and help to improve well-being in their community by collecting and sorting plastic waste, working on the equipment, and selling and installing the final products.

2.2. Second Channel: Benefiting from others' Successful Applied Projects

Case Studies: (Indian Plastic Initiative, Liter of Light Project, Zero Electricity Air Conditioning, and Building with plastic bottles)

In November 2015, India tried to solve its pressing issues regarding plastic waste disposal so the Indian government issued an obligation order for urban local bodies to encourage the use of plastic waste with the other traditional materials for road construction. [9]



Figure 3. A photo shows a road made from plastic waste in India [10]

This second example is the 'Liter of Light' project which aims at providing homes with a sustainable cheap lighting system by using local resources and plastic bottles.

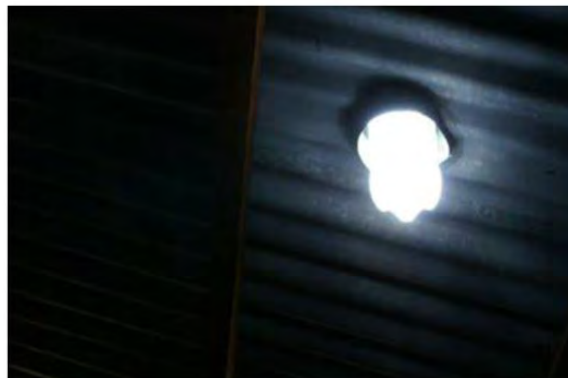


Figure 4. A soda bottle solar light installed in a home in Manila,Philippine. [11]

Another innovative solution is the Zero electricity air conditioner which is a good solution for those communities that suffer from lacking electricity and poor infrastructure in hot areas. This helps them with decreasing the air temperature. The zero electricity air conditioner consists of thermal sheets, bottle cans, small strands, and any phase changing material. In short, the Zero electricity air conditioner depends on the swirl motion created when compressed air expands through a nozzle. As shown in Figure.5. After leaving the bottle's rim, the air starts expanding. As a result of this rapid expansion, the warm air is cooled. [12]

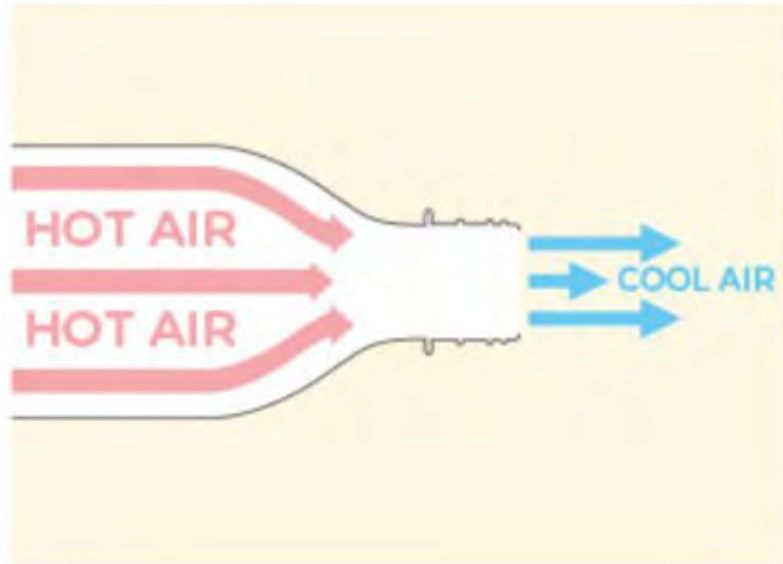


Figure 5. A photo shows the working principle of Zero Electric AirConditioning [12]



Figure 6. Two men installing a zero electricity air conditioner [13]

Plastic bottles can also be used in building walls and reducing the amount of used cement. One of the best innovative projects for building walls from plastic bottles is the Kouk Khleang Youth Center in Phenom Penh, Cambodia. Used plastic bottles are collected and placed in a frame. Generally, there are two techniques, the vertical bottles wall and the horizontal one. To make the construction more solid, steel wires are used to tie walls together. [14]



Figure 7. A youth working on building vertical plastic bottles wall in Cambodia. [14]

3. Third Channel: Continuous Follow-up for New Technologies Under Development

Case Study: (PlasticRoad Concept)

The aim of this joint project - "PlasticRoad" - from KWS (part of VolkerWessels), Wavin (part of the Mexichem group), and Total is to produce sustainable roads made mainly from recycled plastic. [15] According to the developers of these roads, the PlasticRoad has many advantages comparing with the traditional asphalt road such as Faster construction which is more suitable for cities with high traffic like Cairo, Egypt. It has lightweight with an advantage of reducing the risks of ground subsidence, longer lifespan, and multiple uses of the space inside the road. [16]



Figure 8. A picture illustrates a cross-section of the PlasticRoad [16]

Although the emissions of vehicles are considered the most serious problem in any developed country around the world, the situation is completely different either in Egypt or in the developing countries which suffer from problems in infrastructure like unpaved roads, poor infrastructure, and many other problems. In many places, the problem is not vehicles' emissions but the dust and the windblown sand from unpaved streets. In addition to affecting the visibility, these particulate matters have many negative effects on health and the surrounding environment. [17] So, we can find that an innovation like the PlasticRoad is a good opportunity for a country like Egypt and other developing countries suffering from a lack of infrastructure

4. Conclusion

Developing countries like Egypt suffer these days from many problems in many different fields at different scales. This urges us to find innovative and unprecedented ideas and to encourage the social entrepreneurs who not only aim at helping with solving the social problems but also at empowering and enabling their societies to be able to solve their own problems without any external assistance even the social entrepreneurs themselves.

Moreover, we need to invest well in Research and Development projects and not only depend on bringing new technologies from others. On the long-term, we will find that new technology becomes expired and another innovative solutions appear on the scene nearly every day. For this, investing in education and innovation will never be expired, and we will never lose our investments in these two dimensions.

This can be achieved by launching innovation and social entrepreneurs hubs. In these hubs, people, regardless to their age or background, can learn the basic skills required in helping with this big process. When talking about a country like Egypt with 24.9 % of illiteracy[18], we should consider including the very basic skills inside our hubs like learning how to read, write and perform simple calculations[19] in order to ensure that people get the maximum benefits either from the activities inside the hubs or helping the targeted people without any distinction or bias.

Also, these hubs can help the local community to work and collaborate with social entrepreneurs to come up with innovative solutions to solve their pressing problems. Figure 9. reflects the importance of the community engagement in implementing projects and helping social entrepreneurs achieving their aim.



Figure 9. An image shows a poster asking locals to collect recycled bottles for a workshop in Cambodia [14]

Briefly, adopting and applying the suggested concept may help us with preventing the negative impact of our waste which is closely related to our high population growth rates. This will be a good opportunity for us; the more we generate wastes, the more we make products from them and the more we help with introducing new social entrepreneurs into the market. In other words, we convert risks into benefits and challenges into opportunities.

List of recommendations

1. Applying the proposed concept while planning for Infrastructure and development projects.
2. Launching innovation & social entrepreneurship hubs with a mission of advancing the skills of the surrounding local community. These hubs aim at empowering people, especially youth. A lot of activities may be occurred in an Innovation hubs distributed among all the governorates of Egypt.
3. Investing in Research and Development projects especially those that focus on sustainable development.
4. Connecting the hubs together with the social entrepreneurship conferences and competitions in all governorates.
5. Adding some courses concerning 'Social Entrepreneurship' into our curriculum at our primary and secondary schools, or even at the kindergarten stage in order to instill the spirit of social entrepreneurship in our kids at an early age.
6. Instill some core values in the participants such as commitment, integrity, empowering others, innovation, and creativity. We should also teach them how to uphold their credibility inside their communities in order to succeed in their projects.

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