Case 108

Clustering Local Economic Development, Housing and Social Capital

Executive Summary:

Most of us know the age-old saying, “the rich get richer and the poor get poorer” and the truth is that this will never change as long as the current business models, especially around affordable housing and the provision of basic needs. Money is siphoned from communities into the hands of a few such as investors and developers, instead of circulating within the local communities to create growth and empowerment. Poverty can only be eradicated and a middle class can only emerge if the rate of return on capital is lower than the growth rate of the local economy. This case looks at various technologies that can be clustered to help redesign the current business model of housing in general and social housing in particular. Renewable waste streams such as glass can be used to create glass foam, which offers a low-cost solution to housing that is safe and functional. Toilets waste precious drinking water and the mass volume of diapers we currently use contribute to around 8% of a city’s waste and one of the finest resources is destroyed with it. A solution such as dry toilets could save mass volumes of clean water and moving to a biodegradable diaper that is produced locally to keep the cost low could provide nutrients to 1000 fruit trees per infant. Changing our current power supply methods by moving from AC to DC power could save us from our current power crises and provide affordable power and better health to the poor. This case clusters innovations into the context of a community.

Keywords: affordable housing, community, local, corridors of poverty, investors, developers, poor, rich, economy, breadwinners, basic needs, business models, engines of growth, renewable, low cost, double-digit growth, water, power, toilets, diapers, bread, children, education.

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Transforming Corridors of Poverty Through New Models for Real Estate

Anyone walking through a shanty town will sense the lack of dignity in this desolate world. Whenever there is poverty without dignity, we enter the world of misery. The citizens confined to this living space have the right to be impatient and to be upset. There are many options to implement innovative business models to respond to the basic needs; we must make a choice and decide on the direction. Instead of analyzing and rehashing the analyses, one must resolutely proceed towards implementation. This cluster case focuses on a business model that requires a fundamental shift in the delivery of affordable housing and the creation of communities based on the local social fabric. Let us look at South Africa which has a young democracy with a young population and a rapidly growing urban lifestyle; it faces a growing demand for housing. The government has a long list of people waiting to get a home and recognizes that it needs to deliver at least 2.3 million homes if it is to eradicate the existing backlog.

We should not doubt that the South African Government is keen to deliver, but has failed to live up to the people's expectations. After a detailed assessment of the situation, it is clear the government is not to blame; we should blame the prevailing business model. Whenever a real estate project is conceived, investors (capital) will extract all capital gains prior to the construction of the first house and leave the builders burdened by debt with the task to construct shacks in a way that is cheap and fast. The business can be summarized as: rezone, resell and cash out twice. It is necessary to unveil the logic of this money-making machine that does not share any of its massive financial gains with the people who are in dire need of shelter, and who hope to get a glimpse of what it means to live in a community.

How does it work? First investors take control of land through options, preferably on agricultural estates that have exhausted the soil through decades of monocultures and have lost all productivity. Since the land requires a high chemical input to grow anything, it does not generate income. The plot can be acquired for next to nothing. The option agreement means that the investors do not buy the land, but only promise to buy on a future date at a pre-arranged (low) price. The investor pays a fee for having that right and nothing more. When the property is finally rezoned through a political decision, the land is acquired and most of the time it is instantly resold from the option holder to a property developer. Land that was worth one is now easily worth four to ten times more. Without investing the full amount of the value since only option fees are paid billions are made thanks to a political decision.

According to the present business model, the bad news for future home owners is that the capital gains are (legitimately) taken out of the project to enrich those who
succeeded in assembling the options and getting the political decision through. None of these gains are used to make housing affordable. Worse still, the property development company will take a loan that is guaranteed by 60 to 80 percent of the new value, which is created through rezoning only. This means that the loan will be repaid with the profits made in the future on the sale of the houses. So who is paying for the billions that enrich a few? This is only the beginning of a money scheme.

The barren land then gets serviced, often with public funds, and developed by a new group of investors who will undertake the urban planning. The main investment is the drawing up of the plans. When the infrastructure for water, electricity and sewage is in place and the construction of housing can start, the project, which is now ready to deliver buildings as varied shopping malls, schools, hospitals, sport centres and affordable homes, is sold again to a housing developer. This sale earns the cash through the creation of additional capital gains for those who delivered the rezoned land for development, into serviced land ready for construction. This is the second profit taking before the first house is even built. Unfortunately this newly added true value is just like the first one pulled out of the project by taking on additional loans to be repaid through the sale of (low cost) mortgaged housing. The fresh money accumulates in (overseas)bank accounts that are totally separate from the housing initiative, where the cash can earn more money on money speculating on future deals through hedge funds or split-second trades in currencies. An informed guess calculated that 20 years of social real estate development in South Africa has generated sufficient capital gains in the hands of a few, that could have reduced the cost of all social housing already delivered by half.

The housing development company must now deliver the house. Since all the capital gains have been extracted from the project, there is no capital left. Worse still, the exit of capital gains has been made possible by taking a massive debt on the project and these loans have to be repaid. The housing development company is thus leveraged to the edge and depends on mortgage financing from the end consumer to pay off the debt and make their profit. It is the consumer financing from this first-time homeowner who now has affordable housing that will pay off the developer’s debt and the capital gains paid to the speculators, which has already long been extracted.

The housing development company makes money on a margin of the house and its profitability depends on the capacity to squeeze out every possible penny from suppliers. The delivered buildings are certainly not cosy homes. These are shelters lacking the required conditions to build a community. Materials are sourced from the cheapest offers to get the lowest possible cost price. This leads to the typical global sourcing of all building materials, fittings and installations. While this meets the logic of the low-cost housing, it...
drains the total value of this once-in-a-lifetime capital investment out of the community. It is impossible that a home building programme implemented along this logic can ever lift people out of poverty because the poor people carry the debt that serves to pay for the capital gains drained out of the project and out of the community long before their shelter was delivered.

What if the principle of responding to the local needs for a home is first and foremost with growing a local economy, starting with what is locally available and the capital that is generated by changing the purpose of the land? Imagine that the capital gains are not drained out of the project but are allowed to be an integral part of the project. This means that instead of having to press every supplier to the last cent, assets and resources will be available to pay local suppliers at reasonable prices. This ensures that the $25,000 investment in a first home is also an injection of $25,000 into the local economy. That represents a livelihood for five breadwinners who can now aspire to buy a house as well. It is the start of a positive cycle made even better if the materials are locally supplied and the cash circulates locally, strengthening the financials of this housing initiative. Houses can then be sold at even lower cost to the first-time owner, making more cash available for other urgent expenses like health, food and education. This is a new business model.

This business model is not against remunerating capital; it is in favour of asking capital providers and speculators the open question: “How much is enough?” Instead of making one billion or more on a hot deal twice, would the investors who signed the options and assembled the land be prepared to only make 200 million on the deal and dedicate the remaining 800 million to the provision of affordable

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**Real Estate for Poor People**

1. Agricultural land is rezoned;
   
   **Capital gains are drained out of the project.**

2. Unserviced land is developed into serviced land;
   
   **Capital gains are drained out of the project.**

3. Low cost housing is delivered to poor people;

   **The poor people pay the debt through their mortgage that pays for the extraction of the capital gains.**

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housing and infrastructural services which are now operated locally with the original investors still as partners? And most importantly, are the investors who stay on from the beginning to the end prepared to earn a multiple of the amount, diverted to affordable housing in additional income generated from the new revenue streams derived from the growth of a new economy as described below? It is still legitimate to speculate, meddle political influence and extract the paper gains offloading the responsibility to pay to the poor. But it is also a moral high ground and an act of leadership to build a local economy and invest in its growth with the available monies that will in the end be financed by the urban poor aspiring to join middle class.

The decision to shift agricultural land outside of the city’s perimeter to developable land inside the city’s urban edge is a political decision. Can we agree that if and when a political decision of this magnitude (and profit) is taken, then the benefits should predominantly go to the people represented by those officials? Can we agree that instead of making 300 to 500 times the value of the original land options, that a return of 5 or even 10 times is enough? Would investors be satisfied making up to ten times the original amount? This powerful argument will not be received with open arms by traditional real estate development investors who have accumulated wealth for their themselves and their shareholders for decades. Our proposed approach contains capital gains within reason and is a first fundamental component of this new business model. We need to rethink every component and generate income for investors and poor people at the same time, on every need we can respond to locally.

**Buy Local Versus Buy Global**
How much steel and cement is needed to build a house? A representative of the light steel makers and cement mixers would argue that the house cannot stand the test of time without their materials. Sometimes we have to be inspired by the greatest architects of modern times who changed the rules of the game. Frank Gehry, an American architect, certainly belongs to the exceptional creators of form and beauty. Few people realize that foam glass is central to his structures (See Case 103). Foam glass could be virgin material or recycled glass heated up and injected with CO₂ to create carbon-neutral building materials that are light, cheap, resistant to acids, fireproof, structural and are part of a prefabricated building system.

These “Corridors of Poverty” have waste management problems and there is an abundance of glass for recycling. Today recycling is a not well-paid job. If the core structure of affordable houses could include glass foam, then this building technique creates value from nothing, generates jobs, sequesters CO₂, while diverting glass from the local landfill or from overseas exports. This is not the recycling of waste as we have imagined for the past decades; this is the generation of value required to create jobs that will provide income to pay for the mortgage. Glass foam offers higher quality housing with insulation against the cold winters and the hot summers at lower cost, and generates additional jobs that circulate extra money within the local economy. It
eliminates the use of (expensive, toxic and imported) fire retardants and introduces temperature controls that have never been part of affordable housing standards. This is not what Frank Gehry had in mind when he designed the Guggenheim Museum in Bilbao that has attracted millions of visitors to the Basque Country, a region that has been plagued by decades of terrorism counting more than 1000 casualties. The local upcycling\(^1\) of waste to a building material is one of the many industrial initiatives communities could embark upon to turn their housing programmes into one of the many engines of growth.

Evolving from a Deal to a Flow

Let us compare how much money can be made on the sale of a house and the closure of a mortgage. Then compare this income with the potential revenue generated over the next 25 years with the sale of water, food, energy, waste management, mobility and so much more that is needed by the same community. If the community buys electricity from a national monopoly, the monies spent on power leave the community. The alternative would be that a new local direct-current (DC)\(^2\) grid could eliminate the transmission losses and theft of power, ensuring that all electricity is local and renewable. Excess power production is stored in water that is pumped up and stored locally, recovering energy through gravity powered in-pipe turbines and heat pumps that

\(^1\) Upcycling was the title of my book published in Germany in 1998 by Riemann Verlag, demonstrating that we have to go beyond recycling; the end product has to be more valuable than the original one and this can only be achieved if it is used in another sector.

\(^2\) The largest power and equipment suppliers like Philips, Siemens, Mitsubishi Electric, Hitachi and General Electric have created consortia in Europe and North America to advance local DC grids.

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receive water at 90°C and deliver it at 40°C, powering the network at low cost. This DC system now circulates power and money through a growing local economy.

The state (e.g. South Africa) usually obligates power companies to ensure a minimum power supply to poor people at a marginal cost or even for free. Monopolies, either state-controlled or privatized energy companies, have great difficulty making money from these “Corridors of Poverty”. The non-payment of utility bills is high and the pirating of electricity from transmission lines drains up to 30% of the revenues. This makes the delivery of power to the bottom of the pyramid operate at a loss. To deliver a minimum amount of power requires subsidies from the central government and/or a cross subsidy from the higher rates charged to the industry and homes of wealthy citizens. Since the present delivery mechanism does not perform or make money and the poor do not get service, the best way to resolve this is for the poor people to generate their own power.

While energy is critical, water is of equal importance. Installing and operating each resource separately is a costly operation. Combining the delivery mechanism of both offers a portfolio of solutions. This combination of water and power is not only a financially viable delivery system, but it is also an ideal platform for building up a network of emerging micro, small and medium-sized companies. Unfortunately, governments and businesses are organized and operate in silos. Water is dealt with by water experts and power is the fief of power experts. Business strategists are convinced that success is all about “core business”. They cannot imagine that the combination of water and power offers additional growth to the local economy and makes the cluster of basic services profitable beyond the standard investment returns of today. In other words, electricity and water are not only indispensable services, but rather the combination of both stimulates investments that permit growth within the poverty corridors.

**Meeting Basic Needs: From AC to DC Power**

Power lines transmitting alternating currents (AC) throughout a township are tapped by local citizens who do not pay to the city; they pay the criminals who have the know-how to tap power lines and charge ZAR250 for a connection and a flat rate of ZAR50 per month for power. This theft of power also drains revenues out of the community while individuals risk their lives. The City of Johannesburg is losing $260 million per year due to stolen power. The social conditions are such that culpability for power theft by common people is politically unviable. In addition, those who do have meters do not often pay their bills. No city can afford to lose over five years more than one billion in stolen and unpaid electricity. If policy makers or developers wish to improve the situation, then there is a need to imagine a fundamental shift in the business model.

Technologies and the business model have to improve without negating people who need the rightful access to power for their livelihoods. Privatization is not the solution. While the engineers may not appreciate the proposals, we are firmly in favour of
creating hundreds or even thousands of smart local direct-current (DC) grids in the “Corridors of Poverty”. While this smart grid is quite different from the concept promoted at international fora, this energy distribution system based on DC is piracy safe.

Containing piracy and involving the local community in energy economics is not the only reason to shift from AC to DC. Eighty percent of electrical devices used in shanty towns run on DC, which powers phones and radios or LED lamps. It is not only the most energy efficient on the market, but also the cheapest option once industry is no longer obliged to transform power from 220V AC to 12V DC. LED for example could be enhanced with the capacity to be an Internet carrier. Light Source Internet, known as LiFi (instead of WiFi) offers broadband access to the Internet at the speed of light. These seem to be the type of innovations that ensure everyone has cheap access to power and the net at lower cost. Even though emerging economies like South Africa do not yet have an approved standard for LiFi, cities have invested heavily on constructing optical fibers to create the data highway, often missing the last mile. LiFi and DC powered LED lights could soon offer a cheap solution.

DC power grid skills are widely available in the townships. All cars, with repair shops in every corner of the urban tissue, run on 12V DC. This implies that all appliances, which today are designed with inverters and transformers, can be simplified. This cuts cost and could even be produced locally. Driven by local skills and boosted by local manufacturing, a new strategy for power emerges. The money lost due to piracy and non-payment could be partially transformed into an investment in local DC grids, powered by renewables like the Solarus system, uniquely adapted to the multiple needs of poor people. The Solarus power and thermal energy device provides hot water and electricity in one unit. This approach facilitates building a local community based on the energy and cost-efficient delivery of power and water, offering economic benefits beyond the elimination of the negative like piracy, electrocution and non-payment. It converts the negative spiral into a virtuous growth.

In order to stimulate double-digit growth as the condition to eradicate poverty and unemployment, there must be multiple advantages as described briefly in the case of glass foam, Solarus power and the clean water solution. The technology must be converted into a business model that generates multiple cash flows and offers a series of non-financial gains that are equally important to the community. The case of health comes quickly to the forefront. The additional advantage includes the delivery of sanitized water by maintaining the water temperatures in the geysers above 70°C all of the time. Geysers automatically switch off heating at 55 or 60°C, but breed bacteria at that temperature level. Unfortunately, the safe water temperature of 70°C would put an

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3 The DC grid has a positive and a negative cable. Only where both cables meet can electricity be tapped.

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excessive demand on the national power grid, resulting in additional blackouts. It is only through local solutions that these urgent health challenges are overcome.

![Solarus module generating power and thermal heat](image)

From Water and Power to Health

The new business model around the “smart local DC grids” works with the national electric grid as a backup. The local DC grids are the basis of local delivery, with decentralized production relying primarily on solar and water storage (gravity and heat exchange) exploiting the abundant sun. For every 10 to 50 households, there is a trained “DC Lady” as proposed by Harry Stokman⁴ who is an expert in the field. The “DC Lady” would be in charge of supervising the delivery of water and power, and ensuring payment of the bills while guaranteeing delivery of the services derived from clean water and abundant power. If one of the small grids breaks down, then the rest of the DC grid remains uninterrupted. Since water will be stored at +70°C, the heat pumps will make up for any shortfall in power by dropping the temperature to 40°C, generating the additional energy needed without having to invest in batteries.

This generates thousands of jobs for community development projects around major cities while creating the local social capital needed to build up confidence, thanks to the reliable supply of sanitized water and power. The deployment of this delivery mechanism that is supervised by local citizens empowers them, as well as generates and locally circulates the income that is otherwise lost. Thus, this solution is kick started with the “lost” monies that are in the system which never reached the power supplier and could never be deployed for the benefit of the people. There are fortunes at the bottom of the pyramid and there is a need to find out how to redirect them into a global economy and rather ensure that these fortunes contribute to uplifting the living conditions of poor people.

⁴ For further information on Harry Stokman refer to [www.youtube.com/user/HarryStokman](http://www.youtube.com/user/HarryStokman)

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When communities switch to this smart DC system, the first benefit is the elimination of gastro-intestinal diseases. It will provide cheap heating in the winter which will help fight the flu and TB by creating better living conditions in an isolated home (remember the foam glass). Improved health increases workers’ productivity and secures better school grades. In addition, the entire new value chain from Solarus water and power panels, to the DC grids, simplified appliances and lights, complemented by Internet at the speed of light could be locally manufactured. This strengthens the local primary and secondary industries and ensures that affordable houses evolve into communities with an emerging local economy that grows at double-digit rates with monies circulating fast. These components of urban design are basic and easy to implement, yet have never factored into the cost-cutting and revenue boosting programme of the current power supply company.

**Stimulating Local Economy Through Multiple Cash Flows**

At least 70% of the Solarus and the DC systems can be manufactured locally, generating jobs. This virtuous cycle of more jobs and revenue, and more local spending in local hands works as follows: the production of the Solarus systems will require a frame made from heat-resistant plastics. This supports a new recycling programme. Today’s heat resistant plastics are recycled with all plastics and scavengers sell it at $50 per ton to intermediaries, who sell it on to Chinese buyers for $150. When the Solarus units are locally assembled with locally molded frames, made from locally recycled plastics collected from the regional dump, then waste is (again) turned into value and more cash circulates in the economy. Fortunately, all plastics today are correctly labelled and these new components successfully surpass globally sourced aluminum, generating more jobs and income. This only serves to strengthen the argument that we can create growth in the “Corridors of Poverty.”

To create new industries from scratch is a mammoth task. These industrial initiatives require a solid but small start, with the vision to scale up when demands expand. The Solarus assembly is simplified to the point that it breaks even, assembling only 200 units per month. This is in stark contrast to the 1300 units per day of standardized panels that are required to make a profit on a solar photovoltaic panel. This extremely low volume, which is the result of an ingenious assembly design and exploitation of global supply chain concepts, reduces the risk of getting started.

It is possible to plan for at least one plant for every mid-size real estate development project, distributing wealth and improving the local buy-in. These kinds of local opportunities will spread the understanding of the innovations in water and power, using the language that convinces: the experience of the workers who have a job and the
experience of the users who have power, purified water, hot water and perhaps even heating in the winter and cooling in the summer. Even those who do not read and write fluently can fully understand this new reality and explain it to their neighbours. Apart from health and jobs, this new business model will inspire people, bringing a message of hope in most pragmatic terms. We give a future to hope.

**Sources of Funding**

A potential market of millions of units to respond to existing backlogs in housing development alone, and an estimated budget of one billion that was previously pirated from the grid over the years, can now be earned and plowed back into the community, adding income to the city and the people. This cash flow with all enumerated benefits should not be handed over to a savvy investor (with even locals based overseas) for the sake of attracting foreign capital. There is not so much capital needed; there is a need to redirect existing money flows. These local units deliver multiple benefits, offering power at a lower rate than coal or nuclear options. This means that the home owner will have more buying power for key expenses like education, in turn lifting the whole family into middle class. This new decentralized delivery of water and power combined with local production and quality control are all part of the inclusive growth real estate process; underpinning the logic of shifting from a culture of making deals to a participation in the never-ending cash flow that forms the core of the economy: food, power, water, health and education. The positive impact on the community will strengthen this emerging vision around a better future within reach. This will reduce violence and the need to revert to illicit trade to survive the day. Instead of policing society we can now build community.

We have only begun to describe the wide portfolio of initiatives. The very details of all these opportunities would go beyond the purpose of this article. The impact, when dozens or even hundreds of comparable opportunities are unfolding in parallel, will be substantial. That is why any development project committed to inclusive growth should start by building up a portfolio of opportunities and take this as a powerful starting point to mobilize capital beyond real estate, aiming to build affordable housing and communities. In the end it is not about building a cheap home, it is about growing a new community. If we can see the potential impact from merely discussing power and water, then what if we include food, nutrition, health, culture, education, mobility and jobs? Let us look at some of the low hanging fruits.

**Food, Nutrition, Sanitation and Health**

Fruits, vegetables, grains and meat have become global commodities. Seeds and animal semen are controlled by a few dominant enterprises; the harvest is traded by a few; grains are processed by a few and imported by a few; and this business benefits a
few. While the drive to stamp hunger out of this world must be applauded and the resolve of many organizations who undertake this initiative merits admiration, it cannot become an opportunity for a few to earn more on the back of poverty and misery. Over the past years, Africa has seen an absolute increase in undernourishment, whereas Asia has seen a slight decrease in the number of families suffering food insecurity\(^5\). The difference between the two continents is that poor people in Asia have succeeded in increasingly becoming net food suppliers, ensuring their own self-sufficiency while trading their excesses on the local market. We often have to ask ourselves what the priority is: promoting free trade or promoting livelihoods and food security. It is time to accept that free trade cannot guarantee food security, especially not amongst the urban poor.

This is what is needed in Africa. The continent has a fast rising number of urban poor who cram into shanty towns with densities in excess of 20,000 people per hectare, leaving little or no space for any agriculture. The demand for social services from kindergarten to hospitals, sewage and fresh water supply is so high that most municipalities cannot afford it. Unless food security is tackled simultaneously with sanitation and health, urban zones will witness hunger and malnutrition along the same line as witnessed with water and power. Stand-alone strategies to meet stand-alone targets will fail. The solution for the delivery of food, nutrition, sanitation and health to poor people succeeds when integrated business models prevail.

**Plan for Food Security**

A new real estate development inside the urban boundaries must plan for 90% of food security. This is viable if open spaces are secured with a solid flow of soil enrichment. Any food production like bakeries and butcheries must be local. This is not only a matter of nutrition; this is a strategy to ensure that money circulates and remains in the community, thanks to the local processing and delivery of food. The high population density offers unique opportunities to reduce distribution, logistics and packaging costs. Established programmes to farm edible mushrooms on coffee and tea waste offers a first platform that guarantees a variety of protein for human and animal consumption. The processing of coffee grounds and used tea leaves into substrates for mushrooms makes use of a tiny stream of bio-waste from households. However, it is converted into a quick and efficient catalyst in the local economy. Every kilogram of moist, used coffee or tea leaves can produce another kilogram of edible mushrooms, converted into a broad portfolio of essential amino acids, while the leftover after harvesting the mushrooms are ideal as chicken or goat feed.


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Mushroom farming is fast and easy, providing results within weeks. Urban vegetable gardens, the edible bushes and parks, can all form part of the overall urban planning. The key is the continuous circulation of nutrients and energy. One of the critical resources is human waste. It is considered by many as a cost, requiring an expensive capital layout, but it is an opportunity for others. Few realize the business models that could emerge from a waste management process that aims to secure long-term health, food security and jobs while replenishing the top soil that is highly dependent on the continuous addition of fertilizers, which are beyond the means of the majority of the residents in shanty towns.

Wasting Water by Flushing Toilets
The modern standard is to use water to flush toilets. Dry toilets are an anachronism for most citizens. As a result, one third of drinking water in urban zones is consumed for discharging toilets—probably one of the most inefficient uses of this scarce resource. Infants are the only members of the family exempt from going to the toilet and flushing water. Diapers have become the standard means of disposal and while this may save some water, it increases the problem for cities’

One third of drinking water in the city is used to flush toilets.
waste management. The landfill authorities around the world predict that as much as 8% of solid waste will be diapers. These artifacts of modern life were invented in Sweden before the Second World War and quickly emerged as a symbol of modernity. Every child will go through 8000 to 10,000 diapers before she or he is toilet trained.

Children who are not yet potty trained should never be considered a problem. Plastic diapers that cannot be composted should be considered the problem. Biodegradable plastics could be used, but whereas these plastics are more expensive for the time being, locally produced and distributed diapers are much cheaper. Compostable diapers represent the beginning of a process that replenishes the soil while generating revenue and jobs. Ms. Ayumi Matsuzaka⁶, the artist who turned experimental scientist and works with the Berlin Botanical Gardens, demonstrated how a daily service to produce, supply and recover diapers which are subsequently composted in combination with charcoal to produce terra preta⁷ allows a fast, sound and safe way to replenish top soil.

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⁶ Ms. Ayumi Matsuzaka has embarked on a research and communication project which is now expanded with a “Windel” (diaper) programme that is evolving simultaneously in Spain, the Netherlands and Germany. www.ayumi-matsuzaka.com/all-my-cycle

⁷ The blend of human excrements and charcoal has been used as techniques to render soil highly fertile by cultures in the Amazon and Scandinavia.

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The diaper economy is a cash economy. The 10,000 diapers that an infant soils in its first years of life produce approximately 3 tons of high-quality soil which supports the planting of fruit trees on depleted land. Actually, diapers should not be a cost to the family, but rather an investment that is harvested in the form of fruits. When the baby becomes a teenager, approximately one thousand fruit trees will bear fruit, offering plentiful harvests for decades to come. Why limit this to planting one tree at birth since the baby produces enough nutrition for over a thousand trees? This requires urban planning with urban agriculture and urban edible gardens, combined with urban industries, bringing a market for bioplastics that can only become successful if the business model evolves from selling locally produced diapers with biodegradable plastics, to a system that generates top soil on depleted land and provides long-term food security while sequestering carbon dioxide.

When one foresees the size and the scope of activities in the emerging communities and knows that the fruit trees will dot the region at a rate of 1000 per newborn earmarked for social and economic development, then there is another opportunity: bread. Baking bread has become so industrialized that the local bakeries have vanished, or have been reduced to heating up pre-baked and pre-mixed frozen dough. There have been various initiatives to revive the local bakery, but nearly all of them have failed. The reason for this is if a small bakery competes with a minute version of the industrial bakery, it will fail in the competitive game. In order to develop a local bakery that is competitive, it needs to change the business model starting with the dough.

The recent successes in Mexico and Algeria with local bakeries demonstrate that locally produced dough and baked bread can be cheaper and can contain more nutrition. This has been accomplished by making agreements with fruit processing companies (e.g. guacamole in Mexico or grape seeds in Algeria). All seeds are dried, ground and blended to comprise up to 25% of the bread mix. The logic of local economic development is always the same: use what you have and ensure that the money paid daily for bread is now circulating in the local economy. It has been calculated that for every 50 to 100 households, there could be one bakery that uses energy from the local DC grid powered by solar delivering fresh bread every morning. This provides the ideal platform for micro-enterprises.

A housing programme that aims to provide homes for 100,000 families can plan for at least 1000 bakeries, creating an estimated 3000 direct jobs and up to 10,000 indirect ones. The industrial version of that same supply chain will generate 100 jobs at most and spend one third on transport, packaging, marketing and distribution. Replacing 25% of the dough with ground fruit seed flour, using peels to offer taste enhancement and eliminating the associated expenses like plastic packaging, fungal controls,
warehousing and logistics, make the local bakery competitive by generating 30 times more local employment while selling at the same price as the industrial bakery. If on top of that, the housing developments were located close to wheat or corn production, then the value generation by small bakeries in the community can surpass any industrial factory, while this fruit seed and peels fortified and mineral-rich bread has a quality beyond the means of industrial bakers.

The number of jobs generated, based on available cash flow, capital, materials, human resources and even waste offers a first insight into how a local economy can surpass a global economy. This outline of these opportunities confirms that demand can be met with local supply, generating local value, jobs which permit savings and the buildup of social capital. There are many additional opportunities and a few more in the next pages which will support the slogan with which I conclude every fable, “... and it has only just begun!”

Waste Management and Energy
The organic component of solid waste streams is estimated to average 50%. However, the waste streams of shanty towns have a much higher organic part. The biodegradable, renewable and organic waste should never end up in a landfill, neither should it be incinerated. The better approach is to exploit the extra organics from the waste at the bottom of the pyramid to generate more value. Health is always a core concern and therefore any waste, with the exception of coffee and tea that has been sterilized through its use, needs to be cured. The ideal treatment is anaerobic digestion, in other words, methanogenic bacteria mineralize the content, making it inert to producing biogas which is made up of two-thirds methane and one third of CO₂. This bacterial digestion requires a stable, solid and diverse supply or organic matter that is

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blended through smart chemistry\(^8\). Sludge from waste water treatment can be “smartly” combined with organic waste from households and food markets, as well as local small scale agro-industrial processing plants. This smart chemistry generates up to four times more biogas than it would if the sludge or organic waste was digested separately or mixed without consideration of the enhanced reactions.

If the local economic development considers glass as a raw material for the building industry, then it requires CO\(_2\). This gas molecule can be extracted from the digesters’ biogas. Instead of requiring an external supply, foam glass can now be completely locally produced. Production engineers need to study the predictability of the supply chain of goods and materials. The digestion process will always operate because there is abundant sludge from sewage treatment plants or biomass waste from households as long as there is a community. It is the key to building up new industries that rely on secure and predictable material flows so that we can use mathematical models to predict how much income and how many jobs can be expected, while meeting the immediate needs of the local community.

**Animal Husbandry and Fast Moving Consumer Goods**

Goats and chickens should be reared in and around urban developments. While the avian flu has taught the world a few hygiene lessons, the integration of locally produced animal protein provides food security and is yet another catalyst in the local economic growth. Goat farmers on the Canary Islands have small-scale farms with up to 50 animals and enjoy the highest productivity in milk production. Goat’s milk is considered healthier than cow’s milk since it has less lactose and the chemical structure is similar to that of breast milk. Goats also provide leaner meat.

Every small goat farm in the urban environment needs a cluster of businesses so that the maximum value is generated. Goat’s milk has the highest value when it is used in ice-cream. If local farmers team up with a chain of local cooperatives to process goat’s milk into cheese, yoghurt and ice-cream, based on the business model where the farmer receives a 10% participation in the ultimate price paid by the consumer, then the local farmers will earn more money than was ever considered viable, and this is without any form of subsidies.

When goats and chickens are slaughtered in a local butchery, then offal can be converted into protein through the rearing of soldier fly larvae, which are the most productive producers of protein. The South African company AgriProtein, based in Cape Town, has proven that this is viable in both the urban and peri-urban zones, confirming

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\(^8\) Smart chemistry (inspired by the smart grid) proposes the timely combination of organic waste streams of different biochemical compositions in order to generate the highest amount of biogas. This has been pioneered by the University of Linking in Sweden and lead to the creation of the company Scandinavian Biogas commercializes the academic findings.

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the earlier experiences of the Songhai Center in Porto Novo, Benin\(^9\). Hygiene, animal husbandry, food production and nutrition go hand-in-hand with economic growth aimed at uplifting poor people. The same soldier flies can effectively treat human waste (black water and raw human waste) and help resolve another costly budget item on every city’s ledger. This process has passed all sanitary tests to the point that the European Union has approved it.

The portfolio of opportunities for arranging food security within the urban edge is vast. It cannot be ignored that all productive industries require investments. All projects can mobilize funding, provided it can demonstrate demand, a predictable cash flow, a known capital outlay, a transparent break-even point and clarity on the social impact. If we cannot come to a common understanding about the advantages of economic development on a case by case explained and based on a commonly understood method, on the back of an envelope, then we cannot fast track inclusive growth. The implementation of these initiatives cannot be subject to a rigid plan, nor the play of excel spreadsheets. Inclusive blue growth is rather driven by high motivation, focus on local resources, generating more added value, responding to the basic needs and ensuring that the money generated circulates first and foremost within the local economy. Remember the challenge we proposed about how the rate of return on capital is lower than the growth rate in the local economy (r<g). The rate of return needs to be reasonable, the growth rate of the local economy must reach double digit rates.

**Mobility and Jobs**

The standard model is that poor people live in shanty towns and every morning they start their odyssey to find a job or go to work. Informal settlements and shanty towns generate no jobs. Millions of people take the two to three-hour journey one way, spending more than one third of their meagre income just to get to the job. This is not only a waste of time, energy and resources, it does not make sense. The logic of employment in industrial zones is partly due to the traditional zoning of cities with residential, commercial and industrial zones arbitrarily divided according to a master plan made up by urban designers, who have limited experience with the creation of a high growth local economy. The outcome is that poor people sleep on the streets or invade open spaces and are forced to organize their own way to work.

The growth potential to lift people out of poverty is once again demonstrated with the ill-directed financial resources. It is common for a single mother to live with her mother, who is the most reliable babysitter around. She spends about five hours each day commuting to and from work, where she is an office cleaner. The cost of the journey is

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nearly 40 percent of her monthly salary of ZAR 1900 ($190). She leaves home at 05:00 to be at the office at 07:30, starting with a two-kilometre walk to the taxi stand which takes her to the train station. After arriving in the main station, she takes another taxi. After leaving work at 16:00, she may not get home until 19:00 as the trains are often late. She spends over ZAR 700 a month on transport and nearly 100 hours on the road. The inefficiencies that a private household economy has to tolerate would be totally unacceptable for any business manager. Yet, industry in general and employers in particular “externalize” the cost of mobility and expect the marginalized workers to carry it with harsh penalties for late arrival and absenteeism.

The lowest income earners working in the informal economy spend currently +30% of their income on transport. In the South African context, one third of income can be converted into a bond, implying that the cost of transport (ZAR 700/month) equals the value of the bond (ZAR 210,000) against which a house could be acquired. If the jobs were not “there” but “here”, then the money spent on going back and forth to work would be converted from a cost into an asset. The total amount of money that could be diverted over 25 years from expenditure to capital for a planned 100,000 homes reaches ZAR 20 billion (approximately $2 billion). While this demonstrates the “Fortune at the Bottom of the Pyramid”, it also confirms the concept that poor people have the potential to create their “City of Joy”. It is hard to realize the power of the small numbers and even more difficult to grasp that this number can facilitate the arrival of new members of the middle class, thanks to an initiative of affordable housing combined with local job generation.

An Inspiration from the United States
While jobs in the local economy are based on inclusive growth, there is a need to connect with the region. This requires the provision of “feeder” transport, i.e. transportation from the new development zone to the main arteries of public transportation. In the 90s, Mr. John Thomas “Jack” Lupton, heir to the Coca Cola bottling fortune, wished to put his birthplace Chattanooga on the map. He wanted to unlock the run-down inner center of the city in an innovative way. Mr. Lupton embraced the idea of local electric bus transportation for a city of approximately 170,000 inhabitants. The city forged ahead against the advice of all major experts in public

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10 National Development Plan 2030 (South Africa), Chapter 8: Transforming Human Settlement, page 267

11 This is based on 210,000 per family home multiplied by the 200,000 homes that are planned for Wescape in Cape Town.


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transportation and turned the Chattanooga Area Regional Transport Authority (CARTA) into the first American public authority that offers a free shuttle service with electric buses. There was no expertise in the region and if it were not for the leadership of a few city fathers, including David Crocket, the technical, political and organizational obstacles would never have been overcome.

CARTA now has a +20-year history. The electric bus system pioneered the quick exchange of batteries in the bus depot and garage, and now switches to wayside induction: a buried coil charges the bus wirelessly in the parking lot or at a curbside stop. The charge can be generated by solar or be connected to the grid. While traditional charge methods provide battery power to run a bus over 65 km, this induction charge system increases the buses’ driving range to 160 kilometres per day. The energy and maintenance cost is only one fifth of the traditional operating costs of a bus (with fuel at US prices). Since the minimum partial recharge only takes one minute, the buses can run all day, reducing the capital investment in vehicles. When operational costs decrease to a fraction and the living laboratory has a 20-year track record, then this converts the city into a centre of research and a manufacturer of cutting-edge transportation technology. Mr. Lupton achieved what he wished and Chattanooga is on the map.

The bus system based on batteries provides an additional advantage. Any power grid based on renewable energies requires a backup. The traditional solution is a pack of batteries. While this is a technically sound option, it is also an expensive one. Batteries have a rather short life span and this additional cost to stabilize the grid makes solar and wind energies often uncompetitive, unless one opts for a solution that combines the battery power of public transportation provided by the bus batteries as an additional source of electricity when the wind does not blow, water is cold and the sun does not shine. While these backup batteries do not have to supply power for more than a few hours, it is a necessary installation when one wishes to avoid the traditional backup of diesel generators. The smart grid of the new inclusive development ensures that bus
batteries, which run on 12V DC, are charged at night with the excess energy accumulated during the day. At the same time, the bus batteries provide a powerful and cheap component in a resilient community at half of the cost.

Building, operating and maintaining a 20-seater passenger bus provides job opportunities. Mass transit busses are managed within the metropolitan area and feeder busses are managed in the local area. Since the scale is smaller, the window for innovation is larger. This system brings hands-on engineering face to face with new skills that were not available at any of the large scientific centres; hence it represents an opportunity to position the academic platform of this new inclusive development. While others pursue Information and Communication Technologies (ICT), nano-technologies, sophisticated sensors and biotechnologies, this new development zone uses the hands-on experiences, bundling dozens of inclusive growth projects with their financial models as the basis for teaching and inspiring a student audience. This ensures that this living laboratory of inclusive growth brings all benefits to the community, including learning.

Culture and Education

To create a community requires more than water, food, housing, energy, mobility and jobs. One of the most prolific industries is the arts, based on culture and tradition. This must be part of any local economic development since it builds on the skills that people have had for generations. Perhaps some cannot read or write, but over centuries they have enjoyed the knowledge and the wisdom of their ancestors. It is therefore critical that the emerging community enjoys the respect and appreciation for the diversity that characterizes human settlements. Unfortunately in the recent past, culture has been viewed as a necessary expense. The inclusive growth model sees it as an opportunity to generate revenue and jobs, and to celebrate the identity and diversity of these emerging communities.

The African arts, crafts, music and dance are internationally acclaimed. However, just like nature has been considered endangered, and therefore had to be protected, culture is also viewed as endangered and must be subsidized and protected. Protection costs money and will face many hurdles to succeed. It is important to go beyond preservation and embark on active promotion of the arts through creating master classes inspired by the German apprentice system that has succeeded in identifying the innate capabilities of a child at an early age and provide them with technical training, saving many from pursuing an academic path that does not suit their strengths. Exposure to the arts and crafts strengthens the creative, hands-on and technical minds so they can find their career paths.

This reflection on culture and arts brings education to the forefront. Any community that wishes to have a better future for the next generations does not need schools where the
children are taught to memorize what the teacher already knows. These communities need a learning environment where the children can use their imagination from early on, how they can do better than their parents and believe they can succeed in spite of all of the limitations they face. Children must have the opportunity to emerge from their misery, not as victims of globalization, but rather as change agents who will make a difference in their local economy. If the young have this attitude towards life, then these communities will grow.

If community schools emerge in an environment that offers a new approach to urban design and development as we have described, and implements a broad range of innovative business models that respond to the needs, then children can witness the potential of growing the economy. This is the ideal environment for an educational platform. This learning environment will not only serve the needs of the local community, it will attract national and international students from high school to university. This is one of the most catalytic impacts on local economic growth and the presence of foreign students greatly strengthens the self-esteem which is needed to create a strong social fabric.

As soon as parents have some additional financial resources, spending on education is one of fastest-growing budgets, from learning English (the biggest spend on education around the world today) to science. Many parents know all too well that not getting into school, or not finishing school due to teenage pregnancy, is one of the most predictable ways to remain in poverty. Failure to obtain a high school diploma and having a single-parent family ensures that the next generation fails to get out of the poverty trap. Parents who have gone through this course of life are often the most dedicated to guarantee that their children do not fall into the same trap. Therefore, it is key that children sense the potential of progress while they are growing up and they imagine their future.

Children need challenges and must be inspired. That is why inclusive growth, with all the new models that are proven elsewhere, provides a learning environment that allows children to imagine more than what parents and teachers know. This starts with the design of the school itself. Most educational institutions are designed to meet low budgets. Since the early 60s, Anders Nyquist has been designing highly ecological and functional buildings. He applied his science, experience and wisdom to schools to ensure that children have a healthy and challenging environment. This may cost more on capital and building materials, but will lower operational expenses. The greatest benefit is that children who are healthy will study better; they can go to a local school where natural filters cleanse the air so that no one sneezes after anyone else has sneezed, and where these filters are clusters of broad-leaf plants grown in the locally produced terra preta from the diapers of their siblings. It has been demonstrated that


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when innovations are all around, they turn into a way of life. The children will first inspire their parents and then change their behaviour based on solutions that they experienced in school.

**Focus on Value Generation Instead of Cost Cutting**

The critical shift in the business model for housing and community development is a financial one. It is not about cost, it is about value. If there is a school or a network of schools where children are known to be healthier and perform better academically than elsewhere, what would parents do if this was a public school where one can only register on a first come, first served basis, with locals getting the absolute priority? Parents would want to move closer to the school. Then what happens when more parents want to live in the immediate vicinity of a school to guarantee them a place for their child? The land value of the property would increase. When assets grow, then people who live in that neighbourhood become bankable beyond their job and existing mortgage. They can enjoy an asset that represents their life investment because the region promotes health and education, which ultimately means local economic growth. School fees are local, capital gains are local and now the community has a chance to evolve from discrimination to inclusion. The rate of return on capital is outpaced by the rate of social, ecological and economic growth that represents the basis for a future for a whole generation.

This vision turns into reality when real estate and local development aim to achieve inclusive growth, building up assets that lift people out of poverty within one generation and eliminates unemployment. It takes a few years for land speculators to make 500 times their investment. It takes one generation of double-digit growth deploying these funds to lift a whole society from misery into middle classes with sustainable growth parameters, while still providing the investors with a solid return on investment.

**From Vision to Reality**

This article asked the question: “Is it possible to create economic growth that outpaces the rate of return on capital?” The working hypothesis follows the logic that the poor
people will get rich, provided that return on capital is lower than the economic growth rate. The response is a clear yes, provided there is focus on double-digit growth in the “Corridors of Poverty” which are characterized by high youth unemployment; that products and services are first created with what is locally available, and that the value generated turns the existing public procurement and buying power into a golden stimulus that circulates money in the local economy.

The proposal of double-digit growth is viable through the design of new business models for real estate development, where we first build the economy and then rebuild the housing. It rethinks the commerce of building materials, power, water, food, health, mobility, waste management, culture and education. It ensures the highest standards of resource efficiency. This outline is brief and the cases are concise, but are described in detail in the Cluster Cases presented on <www.TheBlueEconomy.org>. This case does not pretend to be a blueprint to be copied as is. This synopsis demonstrates that new business models are not only viable if bundled into a cluster for local economic-inclusive growth; this system will make more impact than is expected. This method is applicable everywhere and it has inspired policy makers and private developers.

Since the present economic system fails to deliver and the economic growth that is expected will bring no extra jobs, I suggest there is no need to analyze why the market economy and the prevailing business model fail to reach the unreached. The reality of today offers a window of opportunity to create local pockets of double-digit growth in "Corridors of Poverty". Once local supply is addressed and people are not forced to commute for hours and the spend of a major portion of their meagre earnings on transportation ends, then local jobs lift people out of the poverty trap. More available money permits micro-investments in productive enterprises, increasing the appetite for risk and building up the confidence to embark on larger business ventures. Even where there is no previous experience, there is always the desire of a parent to have their children acquire the capacity to deliver and do better than previous generations.

We have seen communities realizing the value of such unprecedented innovations in the business models before and were privileged to accompany them over decades. Las Gaviotas in Colombia and El Hierro Island in Spain are a few inspiring examples. The time has come to build on these cases and create new benchmarks of a different scale in Africa for Africa, in Asia for Asia and beyond. I believe that the bold initiatives by Parks Tau, the executive mayor of Johannesburg are exemplary and permit the generation of jobs within months steering society out of the poverty trap that has characterized too many world cities.
For more information

While this article makes reference to a dozen technologies, there are 100s described on the Blue Economy website. There are many additional technologies that have been identified, tried and tested which contribute to the redesign of the business models. These clustered business models will be released regularly over 2015 on the following website:

www.TheBlueEconomy.org

The Blue Economy is the philosophy of ZERI in action. ZERI was created in 1994 after the author concluded that his biodegradable cleaning products and the green factory he had just recently created were not enough to operate a sustainable business. His cleaning products relied on palm oil and his success spurred the destruction of at least one million hectares of rainforest—the habitat of the orangutan. While the philosophy was called zero emissions and zero waste, the research initiative sponsored by the Japanese Government and the United Nations University focused on designing a concept where everything is used and nothing is wasted. The author of this article and all the other cases has focussed on the implementation of this philosophy since 1994.

www.zeri.org

The author has 40 years of experience, has extensively travelled the world, undertaken projects and published books and articles.

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