



In a [well-written article](#), economist David Ndii finally went on record with a counter-proposal to the Jubilee economic platform: "If knowledge and human capital are the engines of economic growth, what is the role of the foreign investment and infrastructure edifices that our governments are obsessed with?" he asked.

Dr. Ndii proposes a more realistic approach for a developing nation such as Kenya: Grow the economy by investing in both knowledge and human capital, rather than by mimicking growth seen in already developed nations that focus investments on infrastructure.

In developing countries like Kenya, the returns on government investments in infrastructure and inventory to create capital will always lag behind the initial amount invested i.e. there will be diminishing returns to scale. Ultimately, it will take Kenya a long time to recoup its investment in the standard gauge railway (SGR), for instance. As we can see currently with this particular infrastructural investment, the level of profits or benefits gained through the building of the SGR is significantly lower than the amount of money invested and will remain so for a long time. This is unhealthy growth, but expedient in the short term, in that it is convenient for the government to make such investments even when it is not necessarily wise or morally right to do so.

However, forming capital in an economy by investing in innovation and acquiring human capital - getting people to be productive and to work - will always lead or be at par in proportion to the initial amount of money or resources invested, creating constant returns to scale. Basically, an increase in investments in knowledge and human capital will cause an increase in economic productivity. This is healthy growth because knowledge is wealth, economic growth is learning, and the individual in conditions of economic and political liberty is the resource. These are uncomfortable notions that governments and people must accept before investing in knowledge; democracy must become an enabling means to ones' productivity and livelihood, going beyond mere politics and electoral cycles.

Dr. Ndii's explanatory narrative of how both Robert Lucas's and Paul Romer's models work together to generate endogenous growth allows us to understand that economic growth, for developing nations especially, is rooted in being able to account for human capital and innovation. In a nutshell, [Paul Romer's endogenous growth theory](#) holds that it is the creation and investment in knowledge, human capital and innovation that is the more substantial contributor to economic growth.

## **Investing in people**

For emerging economies like Kenya, endogenous growth theory and its possible application



allows us to correct nearly 150 years of chasing the consequences of other nations' economic decisions and interests. Put simply, Kenya, just like many other previously colonised African nations, has an economy that is designed to primarily serve the interests of its former coloniser. And despite the intentions of successive governments, a lack of human capital accounting (identifying, reporting and measuring the value of human resources in a country) has ensured that this economic model works to the detriment of the majority of the population.

Of all the devices created by human beings, the government is the most formidable and consequential. The government is responsible for all the best and all the worst happenings in humanity's history, as well as for everything in between. This device has evolved over generations, taking on different forms and purposes consistent with the prevailing paradigms and needs of its wielders.

The aspirations of the Jubilee government, as expressed in its Big 4 agenda, are to spur and ignite Kenya's economic growth by ensuring food security and universal healthcare, building affordable housing and increasing manufacturing. However, motivating an entire nation of more than 40 million people to achieve these goals demands a paradigm shift. Investing in human potential, knowledge, skills and creativity ought to be the drivers of economic growth, rather than the seemingly strict investment in state and capital assets, as is the current government's approach.

Investing in people is not restricted to education; it includes funding for research and innovation, and also investing in information platforms, healthcare and provision of sustenance. In other words, if indeed the Jubilee government wishes to create one million jobs every year, it ought to invest in the people who will do these jobs.

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### **Automation and the productivity gap**

The reality is that technology and automation are putting people out of jobs already. In August this year, the *Daily Nation* reported that 2,792 banking staff had been laid off due to



increasing automation and declining profitability - the effect of unintended consequences of the move to mobile financial applications to reach the unbanked, eliminating the need for intermediaries in the banking hall, coupled with the effects of government policies seeking to cap interest rates. This is an ironic outcome given the government's goal of financial inclusion and greater employment.

Automation in other economies is creating a productivity gap. Increasingly, jobs that were previously done by people are being taken over by more efficient and more accurate machines and robots. This cuts across industries ranging from manufacturing to food production, leaving behind a population of people who do not have the requisite skills for jobs outside their industries. These people fall through the gaps, and remain unemployable for months or even years.

In an article published in *Fortune*, "[This is the Future of Artificial Intelligence](#)",

the wealthy entrepreneur and Xerion CEO, Daniel Arbess, highlighted the profound manner in which Artificial Intelligence (AI) algorithms are eating up human jobs. "Our political leaders don't seem up to the policy challenges of job displacement — at least not yet, but the application of Big Data software algorithms is elevating decision-making precision to a whole new level, creating efficiencies, saving costs or delivering new solutions to important problems." he wrote. "The Bank of England estimates that 48% of human workers will eventually be replaced by robotics and software automation."

Kenya's unemployment rate is [estimated](#) to be 11.4 per cent. This unemployment rate translates to a further [30 per cent of the population living in extreme poverty](#). There are many harmful social and psychological effects of short- and long-term unemployment, including alcoholism, homelessness, and rising crime, especially crimes that target more vulnerable people such as women and children.

The situation is compounded by nearly three decades of missed growth opportunities brought about by the fact that there was a lack of human capital accounting. Even at its most prosperous, Kenya's economic policies simply assumed that jobs would be created via investment in infrastructure rather than in people. Consequently, we have a debt culture that affects the entire nation.

Furthermore, having nearly 83 per cent of the working population [in the informal sector](#) means that capital is not accessible through tax revenues - a situation that the government opted to address through new taxation aimed at mobile transactions and data. Emerging economies like Kenya need small business to thrive, but work is not forthcoming. Business



opportunities are declining, incomes are diminishing and purchasing power is diminishing.

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And because the government is hoarding tenders (in July, Uhuru Kenyatta ordered a freeze on new government projects), business is hoarding opportunities and banks are hoarding finance. As productivity is constrained, banks and non-bank financial institutions (NBFIs) are distributing through debt the purchasing power that businesses are not distributing through salaries.

China is doing the same on an international scale by distributing purchasing power through debt as a substitute for national economic growth. It is building infrastructure, such as highways and railways, using loans that are then spent on Chinese companies that serve China's interests, even though the infrastructure will, hopefully, eventually benefit the debtor nation.

### **Human capital accounting**

A lack of accounting for human capital exacerbates the situation. An economic model that seeks great investment in infrastructure in order to boost the economy but does not account for people engaging in economic activity will result in a mismatch, most graphically seen in an absence of skilled and qualified professionals adept at doing the new jobs that are created. So, without the necessary skills, the locals fall through the employment gaps, and unfortunately, foreigners, with the requisite skills, are hired.

Governments advance the welfare of citizens by establishing and executing public policy for net positive outcomes. This is conventionally done through the creation of rules and regulations, and enforcing their compliance. If viewed in technology terms, the government can be described as a protocol stack (a set of rules) that responds to any input in a prescribed manner consistent with underlying statutes. Indeed, failures in government can be spectacularly linked to the ignoring, circumvention or subversion of the procedures set forth to guide healthy operability among various constituencies and concerns among the citizenry.



Smart-law is the idea that a legal statute can be implemented as a digital computational protocol to which users can connect, execute and return results exactly according to the purpose and design of the underlying legal architecture. There are benefits to a smart-law paradigm, including the fact that it can be censorship-resistant, in that transactions cannot be altered and anyone, without restriction, can enter into those transactions; it is trustless, meaning that trust (knowing and trusting the other party to fulfil their obligations) is not necessary or required, and it does not discriminate in the manner or order of its operations.

The Kenyan government has taken action to advance citizen-centred public service delivery through a variety of channels, including deploying digital technology and establishing citizen service centres across the country. Smart-laws that can provide compliant, straightforward and predictable interactions between citizens and the bureaucracy would have a big and important role to play in this endeavour.

The world in the 21st century is one of advancement through technology. Everything has made a leap forward in one way or another through the impact of technology. It is also true that among all entities, the government remains the most obstinately slow in embracing technology and innovation.

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The time is right for the government to undergo a technology-driven transformation that it so yearns and that will bring it up to par with the industries and sectors it intends to effect. By doing so, it can unleash the potential of the 21st-century citizen.

## **Blockchain technology**

Kenya's recognition of blockchain technology via its Blockchain Task Force headed by Dr. Bitange Ndemo allows for a little optimism. I will provide a simple explanation for this technology. Blockchain is very often conflated with bitcoin and cryptocurrency trading. However, blockchain is an incorruptible digital ledger where transactions are recorded and cannot be altered. In securing these transactions, computer processors complete complex



mathematical equations which when solved are rewarded with a token. The token can be bitcoin, or ethereum, all depending on which blockchain platform is being utilised.

The trading and investing of these coins by laypeople in Kenya (sometimes leading to loss of funds) is what leads both Dr. Patrick Njoroge and Dr. David Ndiu to call cryptocurrency a scam. I am inclined to agree with them on the matter of how the trading is conducted in Kenya - some traders entice investors with a multi-level marketing or Ponzi-style scheme. But I disagree with a blanket declaration writing off this technology and its potential utilisation in governance and its products, the cryptocurrencies. I recently had a robust discussion with Dr. Ndiu on twitter on the same matter.

It is my firm belief that blockchain technology has the necessary framework to address the challenge of accounting for human capital and allowing for democracy and the creation of knowledge in order to grow the economy.

Together with two of my colleagues, Andrew Amadi, who is a sustainable energy engineer, and Chris Daniels, who is an economist and programmer, we created the Freework Society in 2017 with the aim of achieving this particular goal through a programmable economic model built on ethereum blockchain. (Ethereum is an open-source, public, blockchain-based and distributed computing platform and operating system featuring smart contract functionality.)

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In developing a public computing infrastructure that can implement smart-laws, and which can also account for anyone's work and effort, and can allow for investment in innovation, we were compelled to improve the very platform we would utilise by creating a standard. This standard is called an Ethereum Improvement Proposal (EIP), which describes core protocol specifications, client application programming interface (API) and contract standards. In a nutshell, an EIP describes how the platform will function if the proposal is implemented.

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Our proposal is to utilise the opportunities presented on ethereum blockchain technology by creating a human capital accounting framework that provides a merit-based system of indexing human resources, knowledge and talent, and subsequently reducing market search costs and challenges to price discovery and increasing the desirability to share value, work, and assets within the economy. This [proposal](#) has been accepted and assigned Ethereum Improvement Proposal EIP1491.

EIP1491 is a proposal that intends to contribute to the development of a human capital accounting standard on blockchain. EIP1491 allows for the implementation of standard APIs for human cost accounting tokens within smart contracts. This standard provides basic functionality to discover, track and transfer the motivational hierarchy of human resources.

Whereas blockchain architecture has succeeded in the financialising of integrity by way of transparency, correspondingly real-world outcomes will be proportional to the degree of individualisation of capital by way of knowledge.

What this means in an entrepreneurial economy is that where you have employers and workers looking to exchange value (work for money) there is now a proposed standard of how to go about this, and these standard assigns unit value to the labour/work that is done, and creates a meritocracy for those who will do the work i.e. a standard unit of labour with a coefficient that assigns value via points to education, years of experience, talent, and interests.

Suppose there is an employer who wishes to have job X done by a university graduate with three years' experience, for which he is willing to pay Y amount of money. Utilising our standard API, the employer is able to compute how many labour hours he will be required to pay for, and what exact merit the employee will have, meeting the challenge of price discovery. The employer will also reduce his market search cost because he is able to track and locate the right candidate for the job. Both employer and employee are happy with the work because both are correctly directed to the right smart contract.

For millions of people in emerging economies around the world, the potential of EIP1491 will allow for individualised agency, rather than that agency being rooted in government. As we can all agree, despite the best of intentions, governments cannot be trusted to act in the interest of citizens. The best example for this is the debt-based culture that currently runs economies.

This means that an individual's human resource, talent, interest and work has a value that can be exchanged at will because the individual has control over his agency. He is able to



turn his different trades into capital that can be exchanged directly for purchasing power.

The ability to factor in growth in a knowledge-based economy ultimately should mean that not only is unemployment impeded, but that with increased utilisation, time becomes money, waste is reduced and the incidences of unrealised potential and missed opportunities are eliminated. Total factor productivity can be achieved in a shared agency ecosystem where millions engage willingly in exchanging value propositions using their own human capital.

We invite robust engagement and discussion on this standard and its applicability, and [comments on the same](#).