Africa and Complexity: The Enigma of Symmetry

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Advance Notes

FD Amonya*

Nairobi. Traffic is a challenge. A doctoral researcher will tell us more. We will be urged to ponder the potential role of artificial intelligence, specifically machine learning. Let's stretch our view. The challenge of traffic resides in the human ecosystem we call Nairobi. So, we must ask: What's this human ecosystem? What's the dynamics? That question will allow us to understand how the human ecosystem manifests in the challenge of traffic in the city. Where do we start the pursuit of that understanding? The human trail going back 300,000 years points us to mathematics. At least, the Ishango bone instructs so. It shows us our human pursuit of mathematics 20,000 years ago in the present-day DRC. We know little of the past. But all that the past has delivered us is mathematics. That's all we have. The Greeks brought us the word *summetria*. It invokes wholeness, harmony, and beauty. Plato was fascinated by objects that captured those qualities. We remain fascinated by the beauty and harmony of the five Platonic solids. And when the world around us seems to be changing in a messy and chaotic way, we hunt for symmetry. We hunt for deeper harmony and beauty to which we can cling and weave our way to a desired place. Now, we are peering into a system comprising millions of conscience adaptive nodes. That system casts as the state, market, and society. Norms and values of that system (institutions) string across the space. The frame of understanding built from the use of symmetry by Isaac Newton (1642-1727), and refined by the Irishman Rowan Hamilton (1805-1865), just doesn't work! That frame works for two-body relations with good approximations for three-body situations. We face millions of nodes (wielding phones on the palms) that cannot be easily reduced to two-body situations. Well, crises do it. They muzzle everyone into the frame of the leader. But such crises are dark. They've been associated with heavy loss of life. And even when we all come together, the unity is short-lived. We must understand better the normal times (the messy times). We call that pursuit complexity science. It's a deeper quest for the enigma we call symmetry. How can symmetry be so *unreasonably effective*? I am borrowing from Philip Anderson.

Thank you all.

* For over two decades I have peered into infrastructure and public policy across the world. And transport has had a special place. I led the governance theme of a UK development programme called Global Transport Knowledge Partnership that sought to bridge the chasm between policymaking and universities of Africa and South-East Asia. Then, before Covid struck, for four years I ran around the world as Chair, Transport Systems Economics, PIARC. I led policy makers and academics in attempting to understand transport investment in 122 countries by constructing their policy spaces as dynamical systems. I now focus on the policy structures of Africa - assisting African countries imagine post-Covid world. And I am helping steer dialogue on PPP as a member of UNECE team of PPP experts. Then, WCTRS too keeps me busy. I am a Chartered Engineer, Fellow CIHT, and I hold a PhD in policy science (non-ergodic systems). Contact me on LinkedIn or at f.d.amonya@bham.ac.uk (where I peer into complex systems and public investment).