

NASCIO 2014
Q & A with Rebecca D. Costa

The following is a summary of questions attendees of the NASCIO 2014 conference submitted following the keynote address by sociobiologist, Rebecca D. Costa on the challenges the intersection of biology, technology, and public policy present, and why Big Data analytics and other technologies hold the key to future governance:

Q:

In business, decisions are made on the basis of an ROI (Return on Investment), but in government they're often made on the basis of ROV (Return on Votes) – that sets up a situation where technology decisions can be political - or “belief-based” as you call them. What's the solution?

A:

When new data production reaches a point where every 2 days we are recreating the universe of data we created from the dawn of humankind to 2003, then there is only one way that policy decisions based on empirical data can be assured: mechanisms for collecting, filtering and analyzing data within a very short period of time must be deployed – lest policy becomes driven by A) a miniscule subset of available knowledge, or B) unproven beliefs, opinions, dogma, false experts, etc. Government leaders and officials are presently overwhelmed by the velocity at which information is changing, the sheer volume of data they must process, the variety of information (structured and unstructured), as well as methods for testing the veracity of information in a timely manner. This is where technologies such as Big Data analytics, data visualization software, mobile apps, facial recognition software, drones, and artificial intelligence - designed to process millions of data points within pico seconds and provide options based on empirical facts - become vital. Without smart analytics, we are relegated to “guessing” in what is a highly complex, “high-failure-rate” environment.

Technology has no politics. That said, those who arm themselves early will most likely prevail. The role Big Data analytics played in securing President Obama's re-election has been well documented and should be a case study every political leader studies.

The bottom line? When it comes to technology ROI and ROV are not in competition – what works for one, works for the other.

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Q:

How does rapid adaptation affect the nature and scope of strategic planning – does it have a role any more?

A:

In fast-changing environments, long-term planning becomes a real challenge. How can you plan when millions of variables are changing every second of every day? Yet, we have successful models where high rates of failure produce success in spite of unfavorable ratios. The example I often use is the venture capital industry –venture capitalists perform extensive due diligence prior to initiating first round funding. Yet in spite of that diligence, they accept the fact that they are only able to call a winner 10-15 percent of the time. Yet, venture capitalists are successful in spite of overwhelming failure. Why? Because they *plan* for high rates of failure. So from a strategic standpoint the way we look at long-term planning has to change. Long-term planning is no longer about picking the best plan/program, funding it, and then moving forward. It is about moving down *multiple* paths in tandem with the understanding that the vast majority of solutions will not get past the first round of "seed" funding.

That said, many executives claims they cannot afford to fund multiple approaches at one time. Yet, the dollar expenditure is the *same* whether an organization funds multiple approaches - and quickly culls those that prove not to work - or whether they attempt to pick the right approach on the front-end and fund it all the way to completion only to discover they picked wrong (rescue of Chilean miners versus Deep Horizon oil spill) and have to start over again. From a visual standpoint, one investment strategy looks like a funnel – with many approaches to a problem funded on the wide end of the funnel – and the other looks like a column. But the overall *volume* of investment capital is the same. It's just a different way to *distribute* budgets. In one case success is assured, and in the other, failure and a dangerous loss of time is the outcome.

The short answer is that high-failure rate environments necessitate pursuing multiple solutions to a problem ,as well as a mechanism for discontinuing funding to solutions which produce no results. If there is one central principle to keep in mind when planning for success in high failure rate environments it is that diversification is the only known strategic antidote to complexity. And technology the only known tactical.

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Q:

I couldn't copy all 4 attributes of highly adaptive organizations at the end of your presentation – would you repeat them?

A:

1. Fast Adapters: strategic, tactical, technological
2. Empirically-based policy
3. Diversification/Redundancy of solutions
4. Predictive/Preemptive

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Q:

I appreciate your presentation today. Are self-driving cars an attempt to close the gap between the appendages you mentioned we need, and all the features cars come equipped with today?

A:

Self-driving cars offer an excellent example of the intersection of biology, technology and public policy. Today, we need several more appendages to operate all of the features which come standard in an automobile, as well as the portable devices we bring with us into our cars. The fact is, we have become so disconnected from our biological limitations that most of us were convinced that we could safely operate a two-ton vehicle *while* texting. As a result, it became necessary to forge public policy which prohibited driving while texting. If human beings could not “self-regulate,” then the government had no choice to intervene on behalf of the greater good of society. But along comes self-driving cars - a technology which solves the driving-while-texting dilemma and suddenly voids the need for no-texting-while-driving laws. (In a self-driving car, presumably there would be no reason to prohibit texting.) So public policy must change yet again. In this way, the complex relationship between the biological limitations of human beings at any particular point in time, policy decisions, and technology must be examined *as a whole* in order to understand how each effects the other.

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Q:

Is “Luminosity” worth the cost for brain fitness?

A:

Though I have performed some research on brain fitness software, I limited that research to tools which were developed by known neuroscientists – therefore, I cannot comment specifically on Luminosity. As there are many programs made by “gaming” companies which claim to increase cognitive capabilities, I am wary of those who do not offer the credentials of the neuroscientists behind the product. So the first recommendation I would make is to check out the credentials of the scientists behind the software very carefully.

The site I mentioned, Posit Science, is the brainchild of the neuroscientist who performed the first pioneering work in brain plasticity (how the brain rewires itself after injury), Dr. Michael Merzenich (his work is included in my book). As I have had the opportunity to witness various areas of the brain “warming up” as individuals played these games in the laboratories of UCSF Medical Center, I have confidence in their effectiveness. Again, I have no affiliation with this company or Dr. Merzenich. Check out their web site and offerings for yourself – more importantly, check the statistics regarding the use of brain fitness in public schools where a 2X difference in academic achievement has been achieved within 3-4 years by simply “warming up” students brains prior to beginning lessons or

“loading content.” Brain fitness may very well be the revolution in education schools have been searching for – the empirical data is irrefutable.

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Q:

This is the first time I have heard someone talking about biology, technology, and policy, how did you get into this field? The reason I ask is my daughter is studying biology right now and I think she would be interested in your work.

A:

My college education was in a newly emerging field called “sociobiology” (discovered in 1975 by Harvard professor, Dr. Edward O. Wilson) which examines the effect genetic imperatives have on human behavior (individual and group). Coincidentally, while I was a student at the University of California, my parents moved to what was later to become Silicon Valley – ground zero for a technological revolution unlike any other in human history. When I finished college in the late Seventies, I moved home. The best job opportunities were with technology companies. So I joined the first CAD company which offered tools to enable chip designers to design much more sophisticated intricate silicon circuits. Then later, I joined the first optical disc storage maker, and then the first enterprise network company, and so on. As an evolutionary biologist I became increasingly concerned by the rate at which technology was accelerating. How would humans adapt? As our biological limitations (cognitively and otherwise) began to trail behind, what were the social implications? More importantly, had this phenomena happened to earlier civilizations?

Once the company I founded sold to J. Walter Thompson, I retired to Big Sur to live among nature again. I began combing through 100 notebooks I kept while working in Silicon Valley in the 70’s, 80’s and 90’s. The result was “The Watchman’s Rattle” – an examination of the role genetic imperatives play in forging constructive, as well as sometimes perilous, public policy. The book was translated and became a best seller in 26 countries. I was asked to become a spot commentator for a number of radio and television programs and was eventually offered a nationally syndicated radio talk show. Though it seems unlikely a scientist would succeed on AM talk radio, we’re proud to report an audience of over 3 million listeners today – and growing. At the present time I am preparing to introduce a second book which describes the social repercussions of predictive analytics.

I should also add that the effects of complexity and the difficulties of navigating a high-failure rate environment can be felt everywhere – in every industry, every job, every field of endeavor. A third of my time is spent working with government and industry leaders to implement practical solutions which will enable them to adapt faster, and more nimbly, to a fast-changing environment where there are more wrong options than right ones.

