On Smaller Governments and Corporations

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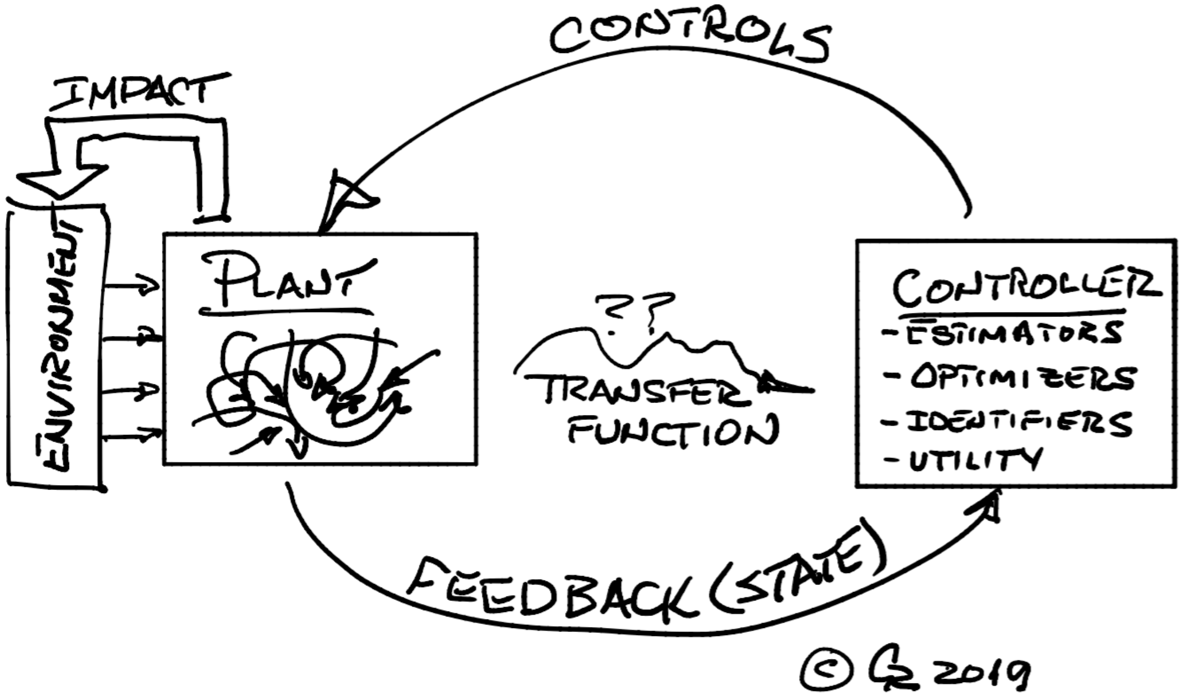
Time to review some important tenets of my credo as they impact Rebane Doctrine's prescriptions for the size and complexity of good governments, good businesses, and good organizations in general. I do this so that I can reference it for the intelligent reader when the inevitable questions of governance and corporatism come up in these pages. For the longtime reader of *RR*, there is really nothing new revealed in the sequel by this retired systems scientist and registered professional engineer in control systems. However, it is the correct way of looking at the realworld, one that really works and has provided us the QoL we all enjoy.

I make this attempt at pedagogy to both educate and illustrate our unfortunate uneducables, many of whom are in positions of power. Since *RR* is a socio-political blog, we shall see here the tragic error that underlies and makes dysfunctional all collectivist ideologies, especially in their approaches to governance. We will then see the spectrum of responses that illustrate this.



The above diagram is a summary of how closed-loop, controlled systems work. Stay with me. The system to be controlled in a desired way is called the 'Plant', and the subsystem that wants the Plant to work in a certain way is called the 'Controller'. The Plant can be anything from a rocket heading for Mars to a Medicare for All program. The purpose of building/developing the Plant is so that it can beneficially impact certain aspects of the 'environment' in which it is to operate – interplanetary space, a population requiring healthcare, a temperature regulated house. The environment, of course, in return impacts the Plant, its operation, and sometimes even its structure.

The Plant is designed to execute a certain set of input/output relations - you jiggle it this way, and it responds by doing that. The predictable part of such input/output relationships (or the 'gazintas/kamzatas') is called the Plant's or system *transfer function*. For realworld systems, the actual transfer function doesn't always turn out to be exactly the one the designers had in mind. The takeaway here is that for complex systems the transfer function is at best imperfectly known, if at all. Systems with unknown transfer functions are uncontrollable. The Controller's job is to always keep figuring out the system's transfer function (called 'system identification') so as to make sure the control commands it fashions and issues will make the system operate in the desired way.

With these prelims in mind, we now get into the next important level of detail. You can't beneficially control anything unless you can see how it (the Plant) reacts to your previously issued control signal/message. In other words, the Controller needs to have some, at least semi-reliable, *feedback* as to what the system has done or is doing. What really is fed back to the Controller is either the system's or Plant's *state*, or, more often, some system output parameters from which its state can then be computed/estimated. State is simply the collection of carefully defined parameters that describe the condition of the Plant at any point in time. Unfortunately, the extraction of a system's state parameters is not always easy, especially for realworld complex systems like a student loan program or nationalized healthcare. Real systems reveal their state in the form of intermittent, noisy, and time-late reports from which state must be extracted. From such 'unreliable' feedback the Controller must estimate what the true state of the Plant really was at any given time. Doing this is a complex affair requiring the use of algos from estimation theory that yield probabilistic answers which must then be correctly interpreted by the Controller. You screw up here, and the system becomes unobservable and therefore uncontrollable.

But let's assume that we have sufficiently useful state feedback and know how the system reacts in general (i.e. we have a good approximation of its transfer function), and specifically how it reacted to our last control command. Onward! In the Controller we now come to the problem of how to determine what is the next control signal to be issued to the Plant. Here we have to detour into the domain of philosophy and subjectivity – what does 'good' Plant performance look like, and how do we make the Plant perform well, in short, what's the next 'good', if not optimum, control command to issue. That requires that we have already defined a quantifiable and measurable system *utility function* or *figure of merit (FOM)* that defines 'good'. And this is where human subjectivity come in – the system's performance must reflect and conform to the values and objectives of the system's owners, preferably those whom the Plant's operation will benefit in some specific way. Here science and technology are mute, and can only help to algorize what the human master(s) prefer. Generating a workable FOM is a political process, whether for a gene-splicing system or a food stamps program.

The final form of the FOM must be a formula that incorporates the system's state and its control commands. Why? Because all Plants are designed to take the system from its current state to a specified future value of state – e.g. arrive at Mars – or maintain state at a stable operating point – e.g. continue successfully processing HMO patients at a given throughput rate. And it must achieve such objectives with a feasible and affordable control sequence within a given time interval. As you can see, all of these measures of 'success', 'affordability', 'timeliness', etc embodied in the FOM are really formal expressions of the subjective desiderata of human beings, and one person's FOM may not be like another's FOM. As I said, science and technology are of no help here, the matter is usually resolved through political dickering after all other approaches are exhausted.

When we study human-based 'systems' – organizations, institutions, corporations, … - the above control theoretic principles apply in spades. However, their application to and analysis of how such human-based social systems operate is far from being appreciated, let alone understood. In thinking about such realworld systems, we have to immediately complexify the simple system shown in the above figure. Realworld systems are made up of numerous such simple systems all connected in different ways so that one subsystem's output forms the inputs to one or more other subsystems down the line. And each of the subsystems operates within the considerations described above.

The overarching system is usually very visible, and its performance reduced to a few parameters easily consumed (and perhaps even understood) by its sponsors, management, politicians, and the public. The existential FOM of the overall system may be something very crude like staying within a stipulated annual budget, and avoiding politically embarrassing scandals. The more meaningful FOM attributes for, say, a healthcare system – throughput rate, average waiting times, medical mistake mortality and morbidity rates, cost-of-care for various maladies, … - are almost always invisible until things begin to go awry, and then the real FOM numbers start being dug out, usually by the press or the opposing political party.

But here it's important to keep in mind that such huge government or corporate systems all accomplish their work through a structured hierarchy of divisions having departments having sections having task teams having … . Each of these translate the FOM of the higher pecking order unit into something that can be used to control (i.e. manage) operations at their particular level. I don't have to go into the details of how such organizations encounter SNAFUs when executing at their levels what we saw in the figure above, and then attempting to accurately communicate their accomplishments to other units. Those readers having been in the military, or government service, or a big corporation have all witnessed the impediments to smooth operations in a complex centrally controlled system.

The thoughtful reader at this point may ask, 'Well, nature is comprised of countless very complex systems most of which seem to go on working productively for millennia if not longer; how then is that possible? And why can't we then emulate the successes of natural systems?' These excellent questions have ready and revealing answers which Man in his hubris has ignored only at his peril. The short answer that communicates to those who understand the above diagram is that nature has solved the control of complex systems through the evolution of complex structures made up of distributed substructures each enjoying the maximum amount of local autonomy by operating with minimized data exchanges with other subsystems, while requiring absolutely no knowledge of their neighbors' or higher order FOMs. In fact, nature does not employ high order central controllers anywhere, all of nature operates with/in communities comprised of the simplest low order distributed subsystems relying on maximally developed and stored 'local knowledge'. Such distributed architectures can then reliably make do with the simplest, and therefore very robust, interacting configurations of embedded controller/plant structures.

Consider the magnificent complexity of a tree. Yet it lives (operates), thrives, and endures with no central controller, nowhere in it can we find a master manager of all the complex functions that a trees carries out from the photosynthesis in its leaves to the transport of select nutrients from its roots which autonomously seek out when and where to extend themselves. The leaf knows nothing of the branch which is ignorant of the trunk that knows not the function of its bark, … . This narrative can be repeated for every living entity and community we see in nature. The magnificent herd of Wildebeests is seen to move as a unit across the Serengeti, not because it responds to the commands from the King of Wildebeests or even orders from a Wildebeest star chamber. It moves as such because each member implements a local control algo that enables it to be a compliant member of its community by just taking inputs from its immediate neighbors and acting accordingly.

Successful human organizations have always exhibited similar structures and modes of operation that fundamentally implement local autonomy to the maximum possible extent. It is when organisms and organizations grow too large and complex while attempting to maintain central control that purposive operation first becomes difficult, then dysfunctional, after which the system breaks down. In human organizations the breakdown of overarching central control can result in catastrophes ranging from the Vandals sacking a weakened Rome to the dystopic post-globalist Mad Max world shown in movies in which control has subverted to small local groups at war with each other. Closer to home, examples include our federal government's VA medical services, family-subverting entitlement programs, public education and career re/training programs, infrastructure maintenance (federal and state), All of them are deteriorating and suffer from the diverse maladies described above.

The worst thing from a systems perspective that one can do in the attempt to fix any such problems is to gratuitously add another layer of complexity to a system the operation of which is already poorly understood or not at all. This seems to be the eternal mindset of the science-free collectivist – every socio-political problem can be solved by enlarging the collective and moving the center of power and control to yet a higher level. As history demonstrates, that strategy weakens and/or eliminates the channels of reliable feedback, and moves the task of fashioning effective controls from difficult to impossible.

The enlightened approach to the design and structuring of such social systems should replicate the lessons from several billion years of natural evolution as today revealed by the broad and powerful array of disciplines from the systems sciences. Everything that humans have successfully done in advancing civilization has come about through the use of 'divide and conquer' strategies. Break big problems down to smaller more accessible problems that have solutions you can put your arms around.

A fundamental tenet of designing and operating organizations that will grow is to never count that your designs and operating protocols will be followed by altruistic people who have your FOM at heart. They will each have their own, and your design and control processes have to take that into account. That is the prime reason all collectivist approaches have failed. In human affairs the effectiveness of altruistic collectivism usually ends somewhere at the first cousin branches in the family tree. Never count on it extending past that. For collectivism to work beyond that the controller needs a gun and the willingness to use it. That's what governments discovered millennia ago, and that's why they want to be the only ones having guns.

Today we witness the malady of leviathan governments in their gross inefficiency and growing incompetence in handling the affairs of state. In our country the disease is noticeable in our deteriorating infrastructure and people's dealings with bureaucracies. Since the 1950s the productivity of America's businesses has increased while that of government(s) have decreased. John Micklethwait and Adrian Woolridge in their *The Fourth Revolution: The Global Race to Reinvent the State* (2014) recount the damning metrics that tell this sad tale of government incompetence and inefficiencies in providing all manner of public services from healthcare to education. The common tale across the land is that as our taxes, fees, and tributes have increased, what we receive in return has markedly decreased due to the inevitable growth of the inherent delinquencies as outlined above.

Those read in the philosophy of governance will recognize that I have presented here a Hobbesian argument for limiting the size of governments (and organizations in general). Thomas Hobbes (1588-1679), a founder of modern political philosophy and, along with John Locke (1632-1704), were intellectual mentors of our Founders. Hobbes was a student of mathematics and its wonders in revealing reality through deductive thought that he bequeathed us in his *Leviathan* (1651). Had he known the formalisms of the system sciences he would have presented his insights and arguments within the context of those tools.

Finally, in this little missive I have tried to collect the more technical and compelling reasons why I have always been an opponent of collectivist governance in whatever form it has taken and portends to take today. To me the support of collectivism is forever the product of hubristic minds unfamiliar with the make-up and behavior of complex natural systems, and more importantly, forever ignorant of how humans respond to perceived risk and reward.

