A Sustainable Strategy for System Dynamics

A Socratic Dialogue

Greenwood Strategic Advisors AG · Zugerstrasse 40 · CH-6314 Unterägeri, ZG
Telefon +41 41 754 7447 · Telefax +41 41 754 7448 · www.greenwood-ag.com

Greenwood
Strategic Advisors

A Sustainable Strategy for System Dynamics: A Socratic Dialogue

Sustainability is always and everywhere a systemic phenomenon. System Dynamics (or simulation of complex dynamic systems) is a powerful technological enabler of enhanced sustainability in socio-economic and environmental systems. How to ensure the sustainability of System Dynamics itself?

Q= Question R= Reflection on the question

Q: Sustainability begins at home – do practitioners in the field of System Dynamics have a strategy for its own sustainability? Let's start with the need…

R: *The need is huge and growing because systemic complexity has been increasing and continues to do so. We're in a target-rich environment which IBM's CEO recently termed "a global system of systems" – most of which are poorly understood, badly managed from a systemic point of view, and destroy lots of value as a result. The growth of systems and of systemic complexity isn't likely to reverse itself so the need for System Dynamics is likely to keep on growing – a strong positive for the sustainability of System Dynamics itself.*

Q: So let's agree that there is and will be huge need for System Dynamics. In comparison to that need, how large is the accumulated systemic impact of System Dynamics and what does that suggest about the sustainability of System Dynamics?

R: *Relative to the need and to System Dynamics' potential contribution, its cumulative systemic impact can only be described as tiny, even negligible. It is ironic but true that the experts who best understand systemic complexity have had very little systemic impact. That applies to System Dynamicists in consulting and corporations as well as those in academia. It's very frustrating to many in the field, a colossal waste of much-needed capability, and it's a strong negative for the sustainability of System Dynamics itself.*

Q: Well, we've all seen the power System Dynamics brings for coping with systemic complexity. So what explains the gap between the need for and capability of System Dynamics on the one hand, and its actual systemic use and impact on the other?

R: *We can start with the fact that, despite many powerful applications over more than 50 years, System Dynamics is not even close to becoming a mainstream methodology – it has almost no share of mindspace. So demand for System Dynamics is minimal, its application and usage are tiny, and compared to need it has almost no impact.*

Q: Does that mean that better publicizing of applications is needed for System Dynamics to be sustainable?

R: *Publicity by itself does almost nothing to ensure sustainability. Technologists tend to believe that people will buy their incredible "widget" in huge numbers once they know how superior it is – and while they're advertising technological wonderfulness, a technically inferior offering runs away with the market. The technologists are wrong*

because the buyers of technical products are really looking for some broader value-creating solution of which technology is just an enabler. Even the most powerful technology rarely creates demand in its own right, and no amount of publicity can change that or generate sustainable demand for technology alone.

Q: But how is it possible that such a powerful capability as System Dynamics does not create demand?

R: *System Dynamicists haven't really been providing capabilities, such as the capability to manage complex dynamic systems. Instead we've been offering simulation models, a form of technology – and where is the big demand for models? The hard reality is that few people want models of any kind and almost no one wants System Dynamics models, apart from those in the System Dynamics community – and we're the exception that proves the rule. Most of the world has no felt need for System Dynamics models and that isn't likely to change.*

Q: Then what do people want that System Dynamics might contribute to or be a part of?

R: *Now we're addressing the right question. Instead of wanting models per se, people want things that models might help them obtain – like anticipatory ability and increased control. They don't care very much how they get those things or whether they come via a model – as long as they come. Regarding systems, what people want is evolving due to climate change and the global economic crisis – there's a new awareness that the world is driven by systems that we don't understand or anticipate or control nearly as well as we should. So there's an increasing felt need for better systemic understanding, even though most people don't yet know what that means or how to get it. Many people are looking for better systemic anticipation, and sometimes they want better systemic steering ability. These evolving felt needs are potential positives for System Dynamics sustainability.*

Q: Hasn't System Dynamics been providing those things all along?

R: *We know that it can and does when intelligently applied, but actual applications have been so narrow, episodic, and unsustained that they're a drop in the bucket compared to the need and the potential.*

Q: But given System Dynamics' potential to provide much-needed systemic understanding, anticipation, and steering, plus a track record of doing so when applied, why isn't there broad demand for it that the System Dynamics community can meet?

R: *That goes to the heart of the sustainability question. There has been no broad demand for System Dynamics because invention is not the same thing as innovation. Invention creates things: the microcomputer is an example. So are System Dynamics models, and System Dynamics itself is an invention. Innovation is different: instead of creating things, innovating creates markets – it literally creates customers. In short, it is innovating rather than inventing that creates demand.*

Q: Are you saying that System Dynamics is not innovative?

R: *I'm saying two things. First, an invention like System Dynamics is not and cannot be an innovation or innovative, and we should not confuse the former with the latter. Second, it is System Dynamicists that have not been innovative – not in academia, or consulting, or corporations. That's why System Dynamics remains virtually invisible – inventions without innovation remain unnoticed and unused. Only people can innovate and we haven't been doing it.*

Q: How can you conclude that given the diversity of System Dynamics applications?

R: *How can we not conclude that, given a wide variety of successful applications for which there is almost no demand? No demand and no market means there has been no innovation, by definition. We have done lots of good inventing but almost no innovating, consequently there has been little demand and no emergence of markets.*

Q: Then what must System Dynamicists do to innovate and create such markets?

R: *There are two parts to it, one about the activity of innovating and the other about the mind-set required for that activity to be effective.*

The action part is well known because creating customers and markets always involves the same things: investing to develop products and services that meet needs. Inventions can play a big part but do not by themselves meet needs until they are turned into products and services that create value in the minds of potential customers.

The mind-set part is less well-known, especially to inventors. System Dynamicists are inventors by nature, and inventors love their inventions and often have trouble seeing beyond them. Focusing on the invention blinds us to the customer's needs and values that are at the heart of innovation and the creation of markets. Effective innovation requires looking at a broader customer-centered reality that includes but is not limited to the invention. It's not easy for good inventors to establish and maintain that expanded mind-set, which is why the work of innovation is so often done by someone other than the inventor.

But that's not an iron-clad law. System Dynamics is naturally expansive and integrative, and System Dynamicists who think in terms of customer realities are well positioned to invest in market-creating System Dynamics-based products and services.

Q: But consultancies have invested in System Dynamics-based services – why hasn't that created demand?

R: *That's mostly a myth. Consultancies have sold the time of System Dynamics experts – which is not at all the same as investing, nor has it left any surplus which could be invested in System Dynamics-based products and services. When consultancies have invested it's been done the wrong way, as when McKinsey set up their Business Dynamics practice: the effort failed both internally and in the marketplace and was quickly aborted. Pugh-Roberts invested successfully in DYNAMO – and it supported the System Dynamics community technically for a long time. Ventana Systems has invested successfully in Vensim and C-Roads and lots of other good technology, probably more than anyone else in the field. But those investments were in technological inventions rather than innovations – consequently they created narrow user groups with little growth or revenue. They certainly didn't generate broad demand for System Dynamics. No*

consultancy has ever invested in broad System Dynamics-based innovation because their business model doesn't allow it. Decades of experience prove that we can't look to consultancies to create sustainable demand for System Dynamics.

Q: Are there any examples of System Dynamics innovation that succeeded in creating demand?

R: *I know of one which began almost by accident and has generated substantial demand – roughly 200 applications simulating customer activities worth many tens of billions of dollars (in aggregate), generating billions of dollars of returns for those customers, and producing more than $100M of revenue for System Dynamicists (in current dollars). I'm thinking of dynamic project simulation, used both for retrospective dispute resolution (roughly 1/3 of applications historically) and proactive risk management and performance improvement (the remaining 2/3 of applications).*

Project simulation (or systemic project management) creates so much value that it has generated demand despite being only partly "productized" due to lack of investment (the consulting business model could not provide the necessary funds). The success of project simulation, in spite of under-investment, proved three important things:

- *There exist common or recurring behaviors that are systemically generated;*
- *Such behaviors can be much better understood and managed through the application of semi-standardized dynamic simulation products, generating substantial customer value;*
- *Those gains create demand for the capabilities conferred by System Dynamics-based products, subsequent applications of which produce yet more gains and more demand.*

Q: Where should System Dynamicists look for other opportunities to invest, innovate, and create demand?

R: *For those interested in the work of innovation, Peter Drucker wrote an excellent book called Innovation and Entrepreneurship – in it he identifies incongruities as being among the most potent sources of opportunity for innovation. An incongruity is something that does not fit, something that by all logic should not be but is. As System Dynamicists we are sitting on one of the biggest incongruities in the history of the world:*

- *Global growth in systemic complexity has far outstripped current human ability to understand and manage systemic complexity;*
- *All sorts of systems need to be better understood and managed, and our present inability to do so does untold damage;*
- *System Dynamics is thoroughly proven as a "missing link" that produces huge value when applied to better manage systemic complexity; AND YET (here is the incongruity)…*
- *System Dynamics is largely unknown, nearly invisible, and hardly ever employed.*

Opportunities for System Dynamicists to invest, innovate and create demand for systemic management capability are as widespread and numerous as the dynamic systems that will benefit from it.

Q: To innovate around that incongruity, what must System Dynamicists do differently than in the past?

R: *Three things: First, we have to focus on particular systemic needs – some condition or behavior that we know is systemic in nature and will create a lot of customer value if managed systemically on an ongoing basis.*

Second, we have to think and work beyond our own experience and perceptions, transforming our knowledge and capabilities to meet the needs of potential customers and create what they will perceive as value. We have to accept that the needs to be met and the value to be created are entirely in the minds of potential customers. In other words, they are not as System Dynamicists would define them. Thinking outside our own experience is particularly important when the need is not yet broadly felt or is just beginning to be felt among potential customers, as with the need for systemic management capability.

Third, we have to move well beyond what we have been doing – modeling, writing papers, teaching classes, and solving narrow analytical problems. We have to start doing something new (for us) – creating products and services that confer, on people who do not have System Dynamics expertise, genuine capability to understand, anticipate, and manage complex dynamic systems.

That is innovating and it will create sustainable demand – not for System Dynamics per se, but for a broader set of much-needed systemic-management capabilities driven by System Dynamics and by complementary inventions built into those products and services. As that demand grows System Dynamics will become the equivalent of "Intel Inside". We who best understand and care most about System Dynamics must love it enough to expand our horizons beyond inventing, and begin innovating to realize its full potential. That, alone, will ensure a sustainable future for System Dynamics and System Dynamicists.

Q: How will innovating change the role of System Dynamicists?

R: *First, we will collaborate with experts in a range of fields and methods that are complementary with System Dynamics, blending our knowledge with theirs in products and services that none of us could create alone.*

Second, we will substantially increase the speed and efficiency of our System Dynamics practice – that will be critical to meeting increased and growing demand for System Dynamics-based products and services.

Third, we will accelerate the acquisition of expert knowledge and the assumption of responsibility by new generations of System Dynamicists – that will also be critical to meeting increased and growing demand for System Dynamics-based products and services.

The early history of the automotive industry demonstrates, in summary form, how innovating is likely to change the role of System Dynamicists. Early automobiles were designed and built by master coachbuilders, and one became a master by lengthy apprenticeship under a master. The number of autos built depended heavily on the number of master coachbuilders. Those masters were the equivalent of today's expert System Dynamicists, and the cars they built constituted significant inventions. They were things of beauty, but they were also expensive and had limited functionality and rather

poor reliability – consequently they did not meet broad customer needs and they created only narrow demand and a tiny market.

Ford innovated by radically changing both automobiles and the means of producing them, offering products that were much more functional, user-friendly, reliable, and affordable – and doing so with much less than master-level construction expertise. Ford created new customers in huge numbers because the products of automotive innovation were much better at meeting their needs and creating value for them – consequently demand for automobiles exploded.

As the auto industry transformed and grew, what become of the master-level craftsmen? One might assume that the need for such expertise died out with new design and production techniques, but in fact the opposite happened. Innovation injected new methods, created new demand, and drove a proliferation of products – and that multi-dimensional explosion resulted in a broader and deeper need for master-level experts and a much wider and richer range of roles for them. Because of innovation there are far more master-level automotive experts today than were ever employed when the industry consisted entirely of masters and their apprentices. Those experts create new products, new functionality, new drivetrain technologies, new materials, new production methods, and new factories. Innovating will similarly increase demand for expert System Dynamicists.

Q: How likely is it, in your view, that System Dynamicists will innovate and that System Dynamics will grow sustainably?

R: *That depends on how dissatisfied System Dynamicists are with old roles and business models. It's impossible to innovate if we stick to doing narrow analyses in a corporation, or selling our time as consultants, or doing research and teaching classes. That's not to belittle those roles and activities, which make important contributions – but doing those things isn't innovating and won't create customers and generate demand for System Dynamics.*

System Dynamicists who step out of those old roles and business models, who take on the work of innovating, who partner with innovative people and institutions, will absolutely produce innovations – System Dynamics-based products and services that meet needs and create customer value. The global need is huge, the capability and potential value are equally huge, so it seems certain that we will succeed in innovating and generating demand to exactly the extent that we work at it.