Technology Evolution, StratML, and the Theory of Life

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In *The Nature of Technology: What It Is and How It Evolves*, W. Brian Arthur sets forth "an argument about what technology is and how it evolves" (p. 4) or, in other words, a theory of technology. (p. 203)

This brief paper addresses some of the relationships between his theory and Strategy Markup Language (StratML) – the international standard for strategic plans (ISO 17469-1), whose vision is: ***A worldwide web of intentions, stakeholders, and results***.

In his concluding chapter, addressing the question of where we stand with our technology creations, Arthur notes, "Theories start with general propositions or principles …" (p. 203) A repeatable element called "value" is among the seven elements of the StratML core, defined as "a principle that is important and helps to define the essential character of the organization." Individuals and organizations who wish to share their values efficiently with others could do so by publishing their plans on the Web in an open, standard, machine-readable format like StratML. Taken together, those values are tantamount to a "theory of life" – for individuals, social groups, and human-kind as whole.

Arthur defines technologies as combinations of other technologies that use phenomena to some purpose. In short, he says, "technology is a programming of nature … a capturing of phenomena" harnessed to human purposes. (p. 203) Each technology is potentially a component of other technology that builds upon forces of nature and serves human objectives. Implicit in those objectives are human values, and in large measure, technology sets the limits on what can be done in support of those values.

The essence of the StratML standard is to enable human beings to document their "purposes" (longer-term goals and near-term objectives) in an open, standard, machine-readable format. Since StratML specifies a standardized vocabulary, it can help human beings communicate more efficiently with each other, and because it is machine-readable, it enables technology to help human beings connect more effectively to accomplish their common objectives.

Not only can individuals and organizations use services enabled by the StratML standard to engage others in order to achieve their objectives but the nature of technology components themselves can be better understood by: a) documenting their purposes in StratML format, which is both human- as well as machine-readable; and b) using the <Relationship> elements of StratML Part 2, Performance Plans and Reports, to name and describe the relationships among them. In other words, to the degree that technology is a "programming of nature," the purposes of such programming can be more readily understood by rendering the objectives of each component in StratML format – in which case computer programs can assist human beings, as well as other computer programs, understand the purposes of each.

Arthur notes that "Digitization allows functionalities to be combined even if they come from different domains, because once they enter the digital domain they become objects of the same type – data strings – that can therefore be acted upon in the same way." (p. 206) The StratML standard enables myriad different services to act upon the data not only in the same way but also in as many different ways as may be needed or desired by their users. Moreover, by bridging the gap between technology and people, the standard can help to make the Internet of Things (IoT) more clearly subservient to the

wishes of human beings and, thus, more trustworthy. By bridging the gaps between the values and goals of individual human beings as well as the organizations we form to carry out our objectives, the StratML standard can help to make the Internet of People (IoP) both more trustworthy as well as more efficient and effective in the pursuit of human objectives.

With respect to the emerging Internet of Things (IoT), it can also help to do exactly as Arthur says: "The representative technology is no longer a machine with a fixed architecture carrying out a fixed function. It is a system, a network of functionalities – a metabolism of things-executing-things – that can sense its environment and reconfigure its actions to execute appropriately." (p. 206)

Referencing Arthur's assertion that management derives competitive advantage in a "generative economy … from its ability to translate its stock of deep expertise into ever new strategic combinations," an open question is whether any organization can have sufficient expertise to accomplish its objectives as efficiently and effectively as competitors who are more open and able to engage others in creating new combinations of value. Indeed, he suggests, "Order, closedness, and equilibrium as ways of organizing … are giving way to open-endedness, indeterminacy, and the emergence of perpetual novelty." (p. 211)

Arthur laments that "we have created a thing, technology, that responds not primarily to human need but to its own needs" while also acknowledging that technology has served us well. (p. 214) However, technologists, as human beings, are too defensive in that regard. Indeed, it is the critics who are missing the point: Technology, broadly defined, is the *universal* means of addressing human frailties. Beyond the limits of training, education, endurance, and perhaps prayer, there is *NO* other means. To suggest that our behavior should NOT be shaped by technology is to imply that we were created as perfect angels in the Garden of Eden, a highly egocentric view of the reality of nature in which we exist. On the other hand, egocentricity is also a natural phenomenon, essential for survival and enforced by evolution. So Arthur's concise explanation of our hopes and fears is on point:

> … for all of human existence we have been at home in nature – we *trust* nature, not technology. And yet we look to technology to take care of our future – we *hope* in technology… [However] we fear … technology that is not in our control. (p. 215)

Much more than our fear of technology itself, we fear of what other human beings may do with it to harm us and others. While we may have high anxieties with respect to threats that we cannot identify, we also have very rational fears based upon plenty of real-world examples of actual and often great harm done not only by those with evil intent but also inadvertently by those with the best of intentions.

One of the expressly stated design principles for the W3C's Extensible Markup Language (XML) recommendation, upon which the StratML standard is based, is human readability – thus helping to overcome the inherent weakness of binary computer programming languages, which are not human readable and thus may carry out nefarious functions without human awareness.

In *Things That Make Us Smart*, Donald Norman introduced the concept of "affordances" – observable clues as to the functions and uses of objects. He says, "The future of human evolution is through technology … the real power of the human mind, today and in the future, lies with our technologies." However, he also observes, "We function by creating mental models – mental explanations of the things we interact with – and if the technology does not provide the information required to create a proper model, we may very well create an improper one." http://ambur.net/smart.pdf

Again, that is where a standard like StratML can add value to our understanding of technology and particularly software programming logic that provides no affordances in and of itself.

In terms similar to Norman's, Arthur asserts: "To have no technology is to be not-human; technology is a very large part of what makes us human." Indeed, without technology, we would be functionally indistinguishable from lower beings. He also proffers: "Technology is part of the deeper order of things. But our unconscious makes a distinction between technology as enslaving our nature versus technology as extending our nature." (p. 216) To overcome our discomfort, forcing technology to describe itself in humanly comprehensible terms should be taken as a natural requirement for we human beings to allow any technology component to exist, much less to exert influence on our lives. In short we should both make our own subconscious fears explicit and require technology to do the same with respect to its functions.

Finally, Arthur concludes, "We need challenge, we need meaning, we need purpose, we need alignment with nature." Life always has and always will present challenges. So we need not go very far to look for them. Instead, the real issues are: a) which challenges we are either forced or choose to face at any particular point in time, and b) which technologies can best be applied to address them.

Moreover, with respect to the challenges of understanding, sharing, and realizing *meaning*, *purpose,* and *alignment*, one need look no further than Strategy Markup Language to find the international standard for the relevant technology.

So the question then becomes what, if anything, each of us chooses to do with it…

The answer to that question will have great bearing on the co-evolution of humans and technology in the coming decades … in a worldwide web of intentions, stakeholders, and results that is either more or less transparent, efficient, and effective than it might otherwise be.

See also http://xml.fido.gov/stratml/references/StratMLOrganizedMind.pdf