



## Editorial: The Role of Art in Innovative R&D

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## Editorial: The Role of Art in Innovative R&D

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As readers who have read my recent editorials will recall, I am a strong believer in innovation in research and I also believe that we need to employ both the right and left sides of the brain. Engineers and scientists typically engage only the left side, which governs our logical and analytical thinking, which of course is of paramount importance for these disciplines. The right side, on the other hand, governs intuition and allows more creativity, which is central to innovative thinking or to thinking outside the proverbial box. Artists in all fields use the right side of the brain most effectively to produce truly creative pieces of art, which are not bound by various laws of thermodynamics or conservation of mass, energy, momentum, etc. Of course, technologists and engineers cannot violate these laws plus the “laws” of economics when it comes to creative designs of processes and products. However, it is generally agreed that even within these limits, engineers have displayed limited innovation and creative original thinking abilities, maybe because of the kind of education and mentorship they have received. This is a theme for another editorial, even a book for that matter, but here I shall focus on just one thought.

Having been actively exposed to academic research and industrial R&D in several countries over four decades, I have had the opportunity to observe and be influenced by dynamic research funding policies around the globe. Some changes I believe are essential, but some are perhaps nonessential, especially because they may have inadvertently impeded innovation and excellence. As a result of my recently developed interest in painting, initially mainly as a stress-relief activity, I have become familiar with the art of numerous famous world-class artists and come to admire and be totally humbled by the peaks of excellence they reached with their ageless contributions. Few scientists, and even fewer academics, can dream of comparable accomplishments in whatever they are doing. However, as the old adage says, “Aim high; low aim is crime.” We must try to excel; the degree to which we can reach excellence depends on where we set the bar. Unfortunately, it seems to me that the bar is now set by external bodies. What one can do and the extent to which one can go is also partially or wholly determined by external, often invisible or certainly opaque, forces or bodies.

An example came to mind when I was admiring a huge number of paintings of sunflowers made by van Gogh, perhaps one of the most copied painters. His paintings of sunflowers simply cannot be fully duplicated by any artist. Then a thought occurred to me: what if he was required to stop painting sunflowers and start painting roses instead, since roses are more popular than sunflowers. What a colossal loss it would have been to the whole world! Fortunately for all the art lovers of the globe, van Gogh did not need huge grants and review panels regarding whether it is feasible to paint sunflowers and make it a commercially viable outcome. They would likely recommend that he should instead paint roses or a huge number of other flowers that people like. What the artist wants and excels at is really of paramount interest. It is pity that often decisions are made based on personal bias or the need to minimize, or preferably altogether avoid, any risk and often follow the leader when possible. Such research can only be nonoriginal by definition. In fact, by taking risk out of the equation we mislabel it as research when it is in fact not so.

Another issue that engineering researchers face, which is unfair, is that engineering research is not considered creative or innovative simply because it is based on known principles of physics, chemistry, mathematics, biology, etc.; even a Nobel Laureate made such a pronouncement very recently. The chief of innovation department at a world-class company known for innovation said exactly the same thing to me two decades ago. It is a pity that even well-recognized scientists do not understand engineering R&D. Suffice it to say that almost all Nobel Laureates in sciences received the recognition they received only after technologists and engineers came up with useful processes and products based on their major discoveries. There is incredible potential for innovation and creativity in engineering design and hence some engineering researchers are much better than others at coming up with innovative ideas or are serial innovators. It is a miniscule minority, but it is not zero! If engineers bring “art” into their design and development there is no limit to creativity and out-of-the-box thinking. Recall that even mathematicians refer to outstanding development of a proof as *elegant* or even *beautiful*—adjectives most commonly used when referring to a piece of art. It is time that scientists and engineers learn from mathematicians and look at engineering designs as pieces of art if they are truly innovative and display significant creativity.

To sum, it is necessary to have policies that at least partially stimulate and support excellence without boxing in researchers to work on readily doable projects and mislabel them as research. Of course, not all researchers may have proven excellence in areas of their interest, but those with recognized excellence should not be forced into other areas to produce less-than-excellent outcomes, which is a loss to the whole global field. Whatever we do as R&D is now

globally available and evaluated. It will become ever more so as the global village becomes flatter and smaller as well.

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