Who is doing Innovation?

According to Jack Morton, an engineer from the famous Bell Labs, innovation is not a simple action. Rather it is a total process. It involves an integrated approach to discovery of new phenomenon, development of a new product, application of new manufacturing technique and creation of a new market. In fact he went on to add that innovation is incomplete without mass manufacturing and it is irrelevant without a market.

An idea is the most elemental unit of human progress. What follows, is a discovery, often describing a scientific observation of the natural world (e.g. first observation of Jupiter's moon). That may not be enough to economic bonanza. It's the engineering use of the scientific discovery in novel ways that leads to invention. The multiplication of invention in large quantities for a wide market is the essence of innovation.

Thus, real Innovation is the last link of a chain that starts with an idea, evolves through discovery, results in invention and lend itself to manufacturing and marketing. Today, the Idea and discovery phases are considered domains of the National Laboratories (as basic research), inventions are deemed to happen in the universities (as technology or applied research) and then Technology Transfer mechanism is supposed to lead to innovations that would benefit the community at large.

Let's look at the reality. There are over 29,000 scientists in ten national laboratories. They are mandated to follow the strict regimen of basic research. Their careers and professional growth are tied to curiosity driven basic research that expands knowledge and involves the acquisition of knowledge for knowledge sake. They are required to answer why, what or how questions and increase understanding of fundamental principles. Those who venture into the applied world are scorned up on.

It doesn't get any better at the universities. The young aspiring professors seeking tenures and graduate students are required to push for fundamental research that will enhance the understanding of existing discoveries and lead to more of the same. Three applied research papers are considered technically equivalent to one basic research paper. As a result, the likely conduit between the basic research and innovation is also choked at its entry point.

So, who is doing innovation that benefits the very taxpayers who fund the basic research? No one!

As a result, on one hand, we have hundreds of scientists toiling on basic research. They have no idea about the pains of the practicing engineers hungry for technological breakthroughs. On the other hand, the sound commonsense and professional experience of engineers from the industry, have no access to the foundational research sitting inside the minds and on the shelves of these national laboratories.

There is a fundamental disconnect. The technology transfer is no occurring freely and effectively. For many successful technology transfers, failures like Solyndra, have brought more searching questions – about selection process and ownership.

As someone who has spent his entire career in Silicon Valley and someone, who is keenly aware of ongoing advances in my areas of expertise, I can share my own experience. Neither my colleagues nor I, have ever had an opportunity to visit either the Lawrence Berkeley Laboratory (LBL) or the Lawrence Livermore National Laboratory (LLNL). They are right in the neighborhood. We are continually looking for improvements in solar panels, battery technologies, advanced materials etc.

In closing, I have some specific recommendations – set aside 10% of the budget for basic research to technology transfer, this 10% may be over and above the existing level (depending upon the compromise possible), tax incentives to companies that establish long-term working relationships with national laboratories and added recognition to scientists and professors doing applied research.

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