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Innovation: How useful is it?

Innovation has become a genuine buzz word to promote one's product or company, to highlight its strength, and to enhance its visibility. The use of words like novel, innovative, etc., help with marketability, enhance economic strength, and elevate initial public offering (IPO) status. Genuine innovation helps with improving lifestyles, health, the environment, and the economy.

In their book, *How Google Works*, Eric Schmidt and Jonathan Rosenberg state that innovation is "production and implementation of novel and useful ideas." As you may note from the previously stated view, thoughts leading to products and processes that alter the ways we do things for the better signify true innovation. Innovation need not be just novel products alone. Any development in processes or implementation of new methods for carrying out an activity, whether on the shop floor or in our lives, is also innovation, with varied levels of novelty.

The innovation process

While it is not feasible to teach or provide a textbook model to innovate, groundwork towards being creative and innovative can be planned and later implemented. Innovation can be broadly categorized as: 1) incremental, and 2) disruptive. It is not necessary that every innovation needs to be totally disruptive and, in a way, erase the established ways of doing an activity or carrying out business. However, such disruptive developments will have broader impacts on society and the end-user community.

For instance, the internet revolutionized the way we communicate and created the IT revolution. Subsequently, social media platforms and search engines sprang up, changing the way we live. Google uses its improved search algorithms to significantly enrich the search process, which is an incremental development. As stated previously, even modest developments in processes and activities can have a great influence on society and change the way we live. Leaders in the field of innovation consider innovations that provide solutions to big

problems and/or cater to the broader needs of society as having a good chance of success in the marketplace.

In addition to finding a panacea to pressing needs, even providing easy ways to tackle an activity will be well accepted. Innovation basically arises when there is competition, dire need for new solutions, and lack of resources for carrying out things in the same old-fashioned ways. Israel is a good example of being a leader in innovation. The need to have advanced products for national security and scarcity of water has led Israel to be an innovation leader with many startups. For example, Israel is a world leader in water desalination technology and an exporter of defense technologies to countries like India.

With resources being scarce, innovative approaches are needed to support R&D endeavors in academia and research organizations.

R&D investments and innovation

Research can be broadly categorized as: 1) basic, 2) applied, and 3) translational. Federal and state governments have roles to support basic and mission-linked applied research. These will lead to "lab-to-reality" in due course, resulting in economic growth. While basic research programs in industry have been downsized, domestic and international collaborations will help all stakeholders to strategically use their resources to grow the research and development (R&D) sector.

Strong support for research by stakeholders is necessary to advance any field and the related industries within it. With resources being scarce, innovative approaches are needed to support R&D endeavors in academia and research organizations. Collaborating with industry, supporting commercialization, and encouraging startups are a few successful approaches to move the R&D sector

forward. Many universities like Texas A&M and Texas Tech University are recognizing patents as important contributions towards academic tenure. Commercialization provides financial rewards to the institutions and inventors, as well as professional recognition. The National Academy of Inventors, a nationally recognized association in the United States, recognizes inventors from academia with fellowships and senior memberships. Many universities have been creative in spearheading the startup culture by providing free licensing for university intellectual property (IP) for its students, as it results in job creation, economic growth, and more importantly, alumni support.

Multidisciplinary research involving different fields such as engineering, mathematical modeling, biomedicine, and sustainable materials is being encouraged to find solutions to complex problems. This has been the model of The Institute of Environmental and Human Health (TIEHH) at Texas Tech University, which resulted in developing and commercializing nonwoven products, such as a sulfur mustard decontamination wipe, FiberTect, and cotton-based oil absorbent wipes.

In speaking about innovation, Professor Ronald Kendall, founding director of TIEHH stated that “innovation is critical for any great organization to move forward to address new challenges and create solutions to those challenges. For instance, even with the COVID pandemic, we have seen tremendous innovation in the United States to develop vaccines, therapeutics, personal protective equipment, and strategies to better maintain our health and economy despite the pandemic.”

R&D in paper and advanced textiles sectors

The paper and textiles sectors are good examples to showcase how planning and strategic approaches help to take challenges and convert them into opportunities.

When the paper industry faced challenges due to the growth in e-communication, the industry strengthened its investments in applications such as hygiene and packaging. Sustainability, recycling, and improvements in design aspects continue to provide new opportunities.

Similarly, when the textiles sector was challenged due to shifts in manufacturing from developed economies to other regions of the world, the textiles industry focused on advanced fields such as nonwovens and technical textiles. These sectors play important roles in developing absorbent hygiene products and industrial and medical textiles. During these COVID-19 times, such products have been lifesavers, and these sectors of the advanced textiles industry have gained tremendous momentum.

Proper and planned investments in research, creating global partnerships, and effective communication with the public and policymakers will enable the industry to move forward and garner much support for research and development.

With challenges come different opportunities, and our industry is not a stranger to such scenarios. Proper and planned investments in research, creating global partnerships, and effective communication with the public and policymakers will enable the industry to move forward and garner much support for research and development. As emphasized by Professor Kendall, “the process of innovation in any organization is critical to the future success and contribution that organization can make to the society of the United States as well as other societies around the world.”

Indeed, innovation in different forms is an important component of a growth equation. **TJ**

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