

## ***Inventive individuals; innovative systems***

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If continuity is to sustain itself, it must be embedded in change; it must continually evolve. Feasible change must be anchored to continuity. Development is incremental, often fulfilling a felt need. Once in place, it generates its own momentum, triggering further developments whose speed or direction could not have been foreseen.

When individual computers were linked through the Internet, it was a significant, yet natural, extension of cold-war era strategic efforts. Similarly, when storage on one computer was made accessible to another through the World-Wide Web, it was a significant, yet natural, extension of interconnectivity among scientists. The scientific community has always been interactive. The web was a small step for it, but became a giant leap for others.

Sectors such as telecommunications, entertainment, supermarket chains, travel, etc. have benefited from the Web, but not as much as the pornographic industry, which now can unabashedly reach out to its customers. It has repaid its debt by introducing innovations such as e-commerce and video streaming. Porn's necessity has become others' facility. Chillingly, the greatest beneficiaries of the web have been child abusers, who can now violate the sanctity of the home and target their victims directly. In general, the bigger the beneficiary of the Internet (and the Web), the less its chances of having thought of it in the first place.

We must carefully distinguish between invention and innovation. Human beings are endowed with intellect and imagination. An invention is the manifestation of an individual's creative mind and is capable of standing on its own, even in isolation. It becomes an innovation when it is incorporated into the mainstream, combined with existing knowledge in such a manner that future developments are influenced by this incorporation. The distinction between creativity and breakthrough comes out well in Francis Darwin's remark: "But in science the credit goes to the man who convinces the world, not to the man to whom the idea first occurs."

It would be instructive to distinguish between what we may call *compulsions of history* and the *romance of history*. Henry David Thoreau observed thoughtfully that "A man is wise with the wisdom of his time only, and ignorant with its ignorance." There are occasions when the wisdom of the time demands an invention. If invention is the child of necessity, then it may be said to belong to the realm of compulsions of history. Such an invention is instantaneously incorporated into the mainstream, bringing its author immediate credit. History chooses the hour, and the hour produces the hero.

There are, however, times when the creative urges of an individual propel him or her beyond the wisdom of the time, producing a freak. This individual's invention belongs to the romance of history. Incorporation into the mainstream, with the attendant personal recognition, may come later when the collective wisdom catches up with the individual's creativity. Note that while the compulsions of history can be recognized by contemporaries, the romance of history can be seen only with hindsight.

A telling example of invention versus innovation is furnished by early 18th-century Europe and what is now the USA. In November 1730, Thomas Godfrey, a "poor glazier" from Philadelphia, invented what evolved into a sextant, which was used in voyages to Jamaica and to Newfoundland. The next year, in May 1731, the invention was independently made in England by John Hadley. America at the time did not need a sea-faring instrument; accordingly, Godfrey's invention remained a dead end. In contrast, Hadley's invention, independent or not, was immediately adopted by all European nations engaged in hugely profitable maritime activity. Efforts by Godfrey and his mentors to persuade London to concede his priority failed. Even if

Godfrey had been recognized as the inventor of the sextant, all fruits of his invention would still have gone to Europe.

The moral of the story is that it is not sufficient for a social system to have in its midst creative people. It should also be in a position to encourage, recognize and, most importantly, benefit from their inventiveness.

Globalization is primarily concerned with generation of wealth and tends to focus on innovation geared towards this end. It must be kept in mind that human ingenuity spans a wide variety of areas. Historically, more effort has been expended in devising ways and means of appropriating wealth created by others than in creating it oneself. Among young educated Indians today, a major preoccupation seems to be devising stupid puns and clever word play in English, which in the last half century has moved from libraries and classroom to pubs and drawing rooms.

Paradoxical as it may seem, globalization taken globally is weighted against across-the-board innovation. Much of the world economy is still based on traditional technology (trad-tech). Also, high-tech production is not uniformly distributed across the world, but confined to pockets. Of the various facets of globalization, the one that has appealed the most the world over is the globalization of consumption levels. These levels are so high now that they cannot be sustained by trad-tech economies. Consequently most young well-trained professionals are willingly doing menial work for international companies, positions much below their skills and expertise and at ridiculously low dollar wages, which still translate into pretty packets in local currency.

One would have thought that globalization would mean more or less similar types of work for similarly qualified people. But this has not happened. S&T is ceasing to mean science and technology and increasingly coming to denote services and trade. R&D inputs required for making trad-tech slim and trim through new tools are hard to come by. The Godfreys of today would be able to win personal recognition and make personal fortunes. To some extent the situation has changed over 250 years, but these inventors would still not be able to contribute to their countries' economies. The French Nobel Prize-winning surgeon Alexis Carrel remarked: "Intelligence is almost useless to someone who has no other quality." In an analogous manner: invention would be almost useless in an economy possessing no other strength.

## References

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