



Innovate or SOMEONE ELSE WILL

Atul Mathur talks about the need to innovate or risk being left behind in the competitive environment.

Beginning Of A Revolution

Innovation is successful exploitation of ideas. Innovation starts with new ideas, but it's not just about ideas. The ideas need to be worked upon systematically to turn them into tangible products or services. As management guru Peter Drucker puts it, "Innovation is work." Indeed, innovative organisations treat innovation like any other business process.

The word exploitation points to the end objective of innovation process: commercial gain. "Innovation without a customer is nonsense; it's not even innovation," says Jeffrey R Immelt, Chairman and CEO of GE.

However, what matters is successful exploitation, but the path to successful innovation is often laden with failures and mistakes. Innovation involves patience and risks.

Innovation still remains a buzzword for many organisations that question its necessity, importance and urgency. The need for innovation, however, can only be felt when one closely looks at the forces that are fast changing the business environment: globalisation, emergence of new technologies and shorter product lifecycles.

Jesse Sullivan, who lost his both arms due to electrocution, recently become the first person to get a bionic arm, an artificial arm that Sullivan can move just by "thinking." Elsewhere, Apple Computer has announced plans to launch iTV, a device that will wirelessly transfer content from a computer to a TV.

And the US Army has decided to deploy Radio Frequency Identification (RFID) based system by 3M to manage the medical records of 150,000 service personnel and their dependents. All these development are new, yet they represent a process as old as human race itself: innovation.

Organisations like Apple, Google, 3M, Toyota and GE have made innovation an inseparable part of their competitive strategy, but the majority, comprising scores of small and medium enterprises, still doesn't see the need, urgency and benefits of innovation.

Thanks to globalisation, a process defined by IMF as “increasing integration of economies around the world, particularly through trade and financial flows”, organisations today faces both an opportunity and a threat. Opportunity comes in the form of access to newer markets while the threat comes in the form of greater competition, particularly from lower-wage countries.

There is stark difference between the hourly wages of developed and developing countries. Globalisation is forcing producers to become more productive, flexible and responsive through constant innovation.

Into The Future

Rapid advancements in technologies like information and communications technologies (ICT), biotechnology, and nanotechnology are already having an impact on a range of industries. For example, MEMS, which is the integration of mechanical elements, sensors, actuators, and electronics on a common silicon substrate through microfabrication technology, is set to revolutionise nearly every product category.

Similarly, researcher are already envisioning a pervasive wireless future in which RFID tags installed in products send messages to consumers, cars talk to each other to avoid collisions and people walk around carrying heart and blood pressure monitors with links to their doctors.

Manufacturers operating on the global level are already feeling the heat. “Rapid technology changes, shorter product life cycles and commoditisation—these are the key challenges that we face. Retaining product/service competitive edge in a fast changing landscape is hard,” says Sri Nidhi, Director (Operations), Eutech Instruments, a leading manufacturer of water quality instruments.



Global power consumption will nearly double between now and 2025, says Helmut Gierse.

Innovation is not just about survival. The true motivation for innovation should be greater competitiveness, growth and profitability.

Helmut Gierse, President of Siemens Automation and Drives Group (A&D), gave an example of how some companies see the change as a business opportunity. According to him, by 2025 world population will be eight billion and, as per the estimates of World Energy Council, global power consumption will nearly double between now and then to over 30,000 terrawatt hours per annum.

For Siemens, on one hand, this is an opportunity to participate in the expansion and automation of power industry and all the downstream industries where the power will be used, and on the other, it’s an opportunity to exploit the field of energy efficiency by coming up with more energy-efficient drives and motors.

Investing For Growth

Siemens invested 5.1 billion euros on R&D during the year 2004. Internally, its 45,000 strong team of researchers registered 8,200 inventions, which is a jump of 11 percent over the previous year. The company, for the same year, held a portfolio of 48,000 patents.

Some of the world’s largest companies have invested in innovation, for that’s the road to competitiveness, growth and profitability.

Company	R&D spending 2004 (billions)	R&D as percentage of sales
General Electric	\$2.4	2%
IBM	\$5.2	5%
Johnson & Johnson	\$5.2	11%
Microsoft	\$7.8	21%
Nokia	\$4.8	13%
Proctor & Gamble	\$1.8	4%
Sony	\$4.7	7%
Toyota	\$6.4	4%
Leading investors in innovation		

Even countries’ growth and prosperity are now seen closely linked to their innovativeness. Singapore is one of the countries focusing on innovation as an engine for future growth. The country is aiming to jack up its R&D spending to 3 percent of GDP from the current 2 percent.

The government has also set up two specialised agencies. One is the Research, Innovation and Enterprise Council (RIEC), which is an advisory council to the government. The Council will include talents from the private sector, the scientific community and academia, as well as key ministers. In addition, a National Research Foundation (NRF) has been set up, which will focus on funding long-term research in strategic areas.

Innovation, as a process, is applicable to all the key elements of a business: products, services, processes and business model.

In early 2001, Apple hit upon an idea of creating a portable, digital music player that could download, store and play music. Nine months later, iPod was born—one of the hottest consumer products. As a result, Apple's profits surged like never before.

Emerson Process Management recently announced a new generation of high temperature sensors designed specifically for increased sensor life and greater performance in elevated temperature applications (up to 145°C). Nissan has introduced touch screen navigation in its cars—another example of product innovation.

Mr Nidhi points out Eutech's latest innovations: "Touch screen instruments for water analysis with Windows GUI in colour and multi-parameter water analysis instruments with advanced communication capabilities". Whether it is consumer products like cameras, mobile phones and TVs or industrial products like controllers, instruments and drives, products remain the most obvious target for innovation.

Starbucks has started providing a new facility to those who come to sip coffee in its trendy stores—wireless Internet access. McDonald's in US has installed automatic payment kiosks in its restaurants. Customers can look at the menu in the screen, order what they like and make payments—without talking to any human being. And we all know how banking is fast going over the Web and mobile, too. For any organisation, its services offer another wide area of opportunity for innovation.

An organisation's output is nothing but a cumulative result of various business processes, such as design and engineering, purchasing, recruiting, manufacturing, storage, distribution, retailing, servicing, etc. When someone takes the initiative to improve existing business processes or eliminate inefficient ones and introduce new ones, that's process innovation. Toyota implemented the idea of lean manufacturing in 1960s and 70s, which led to the increase in quality and reduction in the cost of production. The success of ERP and MES systems shows the potential of innovation in business processes.

A Case For Innovation

IAA talks to Raymond Tan, Head of Strategic Planning, Corporate Marketing & Public Affairs and Sheng Thong Yin, Technical Manager about innovation. Both are from 3M Technologies, Singapore.

Q: Why is innovation important to 3M?

A: Since its founding in 1902, 3M has prided itself on bringing innovative new products to the market – from Wetordry sandpaper & masking tape in the early days to Post-it notes and brightness enhancement films more recently.

This culture was embedded as a management philosophy by 3M President William Mc Knight in 1948. Essentially, his advice was to hire good people, let them do their jobs and forgive their mistakes as we learn together. A key dimension to the culture is the ability of any employee to spend 15 percent of his/her working time on projects of their own choice. Innovation is truly a part of the company's DNA.

Q: What's the 15 percent rule?

A: Under the 15 percent rule, 3M encourages its worldwide technical community to spend up to 15 percent of their time on projects of their own choosing. The programme enables them to develop ideas free of management interference.

A case in point is Charlie Barlow, Medical Imaging Systems Division scientist, who used the company's 15 percent rule to research a helium-neon printing plate that became widely used in the check printing industry.

A formal programme for developing the product was not initiated at the time because of a limited market potential, but Barlow pursued the project anyway because he believed that changing technology would eventually result in a future market. Within a few years, that market did indeed develop.

Q: Can you give an idea of 3M's investment in innovation?

A: Here are some figures:

- US\$1.1 billion spent on R&D in 2005
 - 5.2 percent of sales
 - US\$5.5 billion over the last five years
 - 20 percent on basic research
- R&D in labs in 34 countries
- 6300 scientists worldwide

Q: What are the main pillars of 3M's culture of innovation?

A: 3M isn't a company organised by geniuses. It's a company organised by employees who always take their customer's point of view, and who cooperate with each other to find solutions, while maintaining their own independence.

Innovation is part of the expectations from each employee and starts with individual creativity. Such contributions are recognised by the company through many award programmes, including the prestigious Carlton Society membership.

In addition, the dual ladder career structure allows technical employees to pursue purely technical goals while enjoying the same career advancement as senior management. The company will also sponsor individual employee ideas outside of the regular operating structure through seed money from Alpha & Genesis grant programmes. Creative employees are truly the company's hidden assets.

A Role Model

Beyond products, services and business processes, organisations must look at the very model on which their businesses are based on. Dell has become the world's number one computer maker based on its new business model of dealing directly with customers and eliminating the retailers in between.

Gary Hamel, Visiting Professor at London Business School and Chairman of Strategos, an international consulting company says, "Greatest rewards go to companies that create new business models that create new sources of revenue based on changing technology, demographics, and consumer habits. To create new markets and new wealth, managers need to begin thinking about innovation at the level of entire business concepts".

Another way of looking at innovation is in terms of its magnitude and impact. Adding new features to an existing product, service or process is incremental innovation. Incremental innovations are small, but when done on a regular basis, they can provide solid competitive advantage to an organisation. Toyota owes its leadership position in the automobile world due to its relentless incremental innovations.

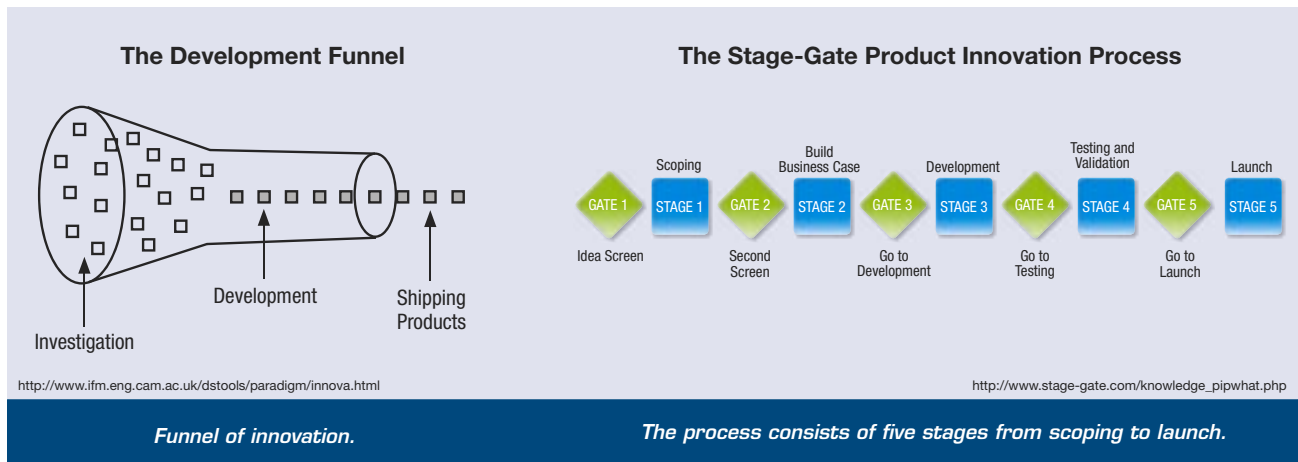
the wide opening enter scores of ideas and flow through various stages/gates: assessment, funding, development, testing and commercialisation, before coming out of the narrow end. Obviously, not all ideas reach the end and majority of them get eliminated on the way.

One of the well-known and widely implemented product innovation processes is Dr Robert Copper's Stage-Gate product innovation process. The process was developed based on research on product successes and failures.

A Stage-Gate process is a framework to turn an idea into a successful product by systematically developing and passing it through a series of five stages and gates. Stages represent accomplishment of specific tasks by the cross-functional innovation teams and gates represent management's decision points for go/kill decisions on a particular project or idea.

Whether an organisation can successfully innovate depends on whether it has processes to generate and capture new ideas and then systematically assess, fund, develop, test and commercialise those ideas.

According to Drucker, innovation is hard work and most successful innovations result from a systematic and



The opposite of incremental innovation is radical innovation, something that has a big impact on the entire industry and market. Skype, a subsidiary of eBay, is now offering free phone calls over the Internet. That's a radical innovation set to change the dynamics of telecommunication industry. Advent of PLC in late 60s similarly made relays obsolete and changed the automation industry forever in profound way.

Innovative organisations keep a portfolio of innovations, comprising a large number of incremental innovations and few big bets—radical innovations.

The Whole Spectrum

Innovation starts with ideas and ends with new or improved products, services, processes or business model. The process can be envisioned as a funnel. From

purposeful search for innovative opportunities. Four such sources of opportunities can be found within the company or industry: unexpected occurrences, incongruities, process needs, and industry and market changes. The three additional sources exist in the outside environment are demographic changes, changes in perception, and new knowledge.

Unexpected occurrences, successes and failures, though often ignored by organisations, offer one of the easiest and simplest opportunities for innovation. Corn flakes, penicillin, teflon, dynamite, PVC, photography and stainless steel are just a few of the many innovations that happened as a result of someone paying attention to an unexpected occurrence.

A study by Donald Lehmann of Columbia University and Jacob Goldenberg and David Mazursky from Hebrew

University of Jerusalem compared different sources of innovative ideas. The study included research on 197 product innovations, out of which 111 were successes and 86 failures. The research showed that taking advantage of random events generated 13 times more successes than failures.

An incongruity is a discrepancy between what is and what ought to be. P&G noticed that many aging baby boomers were experiencing all kinds of creaks and muscle twinges. Drugs could treat the pain, but they also had side effects, like stomach ailments. That's an incongruity. People don't want to live with the pain, but they don't want to take drugs to kill the pain because of side effects.

P&G viewed the incongruity as an invitation to innovate and came up with a new product for aging population, ThermaCare, self-heating wrap for muscle pain.

For process needs, the word "need" suggests the very nature of this type of innovation opportunity. For example, in a production process, which otherwise runs smoothly, there could be one stage/step that consistently poses problems in terms of quality or delays. That's an invitation to innovate.

Markets and industries remain in a constant state of flux, which itself is a source for innovation. The movement in the software industry towards open source software is a major structural change, which is opening up opportunities for innovation.

A Variety Of Needs

Demographics, defined as the characteristics of a population in terms of age, sex, marital status, family size, education, income, geographic location and occupation, is a well-known source of innovation.

One demographic trend that is attracting the attention of many companies is the ageing of population in developed countries: Japan, Europe and the United States. Seeing an opportunity, Matsushita, better known for its Panasonic and National brands, has invested in creating a hi-tech retirement home for elderly people. The 106-bed retirement home, called Sincere Kourien, is located in the town of Kourien on the outskirts of Osaka in western Japan.

The main feature of this facility is that patients are cared for by robots in the form of bears. Under the fur, these bears, known as Teddy, hide a microcomputer and a local network connection. The bear helps to monitor the condition of elderly residents by monitoring person's response time to spoken questions, recording how long they spend performing various tasks, relaying conclusions to staff and alerting them to unexpected changes.

Vodafone is developing mobile phones with designs tweaked to the requirements of older customers. IBM has created a computer mouse that compensates for the tremors—something common among seniors.

Regardless of facts, sometimes, it is the changed



Large keys, jumbo-sized number display and speed-dialling are features important to the aging population.

Siemens

perception of reality that counts. The recent shift in the perception about the importance of security due to terrorist threats is an opportunity for innovation in a number of fields.

New knowledge, especially technical or scientific, is one of the most popular sources of innovations. Internet, wireless communications and nanotechnology are just a few of the many areas where new knowledge emerging and throwing up opportunities for innovation. Knowledge-based innovations, however, involve long lead times and higher risk.

Apart from policies, processes and systems, innovation requires a certain type of climate to flourish: commitment at the top, a culture of experimentation and acceptance of failures, focus on customers, cross pollination of ideas across different departments and incentives in the form of rewards and awards. Innovative companies carefully cultivate and maintain a culture of innovation.

To an organisation struggling for survival, innovation may look like a luxury. And to an organisation doing well today, innovation may appear to be a distraction. The fact, however, remains that the only thing constant is the change itself.

Either one gets engulfed by the waves of change in the business environment or rides them for healthier and brighter future. To a business that is struggling, innovation is the cure. To a business that is doing well, innovation is insurance for the future. Innovation is not an option; it's a necessary response to the growing heat of competition in today's globalised world. Innovate or someone else will. ☹