The Top 12 Trends in the Science of Managing R&D and Product Development: Part Two

Continuing on from our previous installment, here are the remaining six top trends in the science of product development and R&D management. When looked at collectively, these 12 trends will give you an idea of how much change is on the horizon for engineering and product-development organizations.

Trend 7. Engineering and Development Automation: Many engineers are seeing the changes brought on by rapid prototyping. Soon, robots, real-time software testing, and many other technologies will permeate the downstream end of product development. There will be less people involved in developing and delivering products. Conversely, there will be more people involved in solution planning, designing, and developing data-based software for customers that wraps products in blankets of information throughout its lifecycle (*Harvard Business Review*, November 2014 and October 2015).

Trend 8. Micro-Nano Effects: Product values will increasingly be defined by software, and products will continue to shrink in size. As sensors, motors, actuators, and other fundamental components get smaller, engineering activities and disciplines will change as well. Gradually, the importance of materials science and atomic-scale knowledge will supplant today's primary macro-scale competencies. Processes such as design reviews will eventually be conducted via electronic media and through microscopes.

Trend 9. Physical versus Virtual Work: More than half of all business email is now processed on handheld devices. Three-quarters of a typical company's product cost is outsourced. Globalization is officially business-as-usual. Engaging contractors in lieu of employees is a mainstream tactic. Commuting and business travel time is increasingly variable. Employee leave and PTO policies are changing. We are nearing a point where employers no longer strive to police employees' physical location, so long as the job gets done. The infrastructure to address industry's rapid transition to an increased level of virtual work will soon emerge.

Trend 10: Measurement and Correlation: In the paper age, the cost of calculating metrics was expensive. Today, with databases already holding all the numbers, the incremental cost of a metric is nearly zero. This is why the number of metrics, measures, data points, and info bytes we encounter each day is increasing rapidly. Soon, all the data for activities and products will be available for every point in a product or activity's lifecycle. When we reach that point, analysts will be able to reconcile causes and effects, letting them correlate nearly all measures and metrics to an outcome. With known correlations, the number of measures needed to manage with certainty will decrease. We will know which measures are predictive.

Trend 11. Open Innovation: Benchmarking in the 1980s changed what corporations historically considered to be private information. The fortresses surrounding most companies soon had doors. Globalization and outsourcing in the 1990s added more doors. Open innovation is installing even more doors, and is here to stay. All companies will learn to create doors to acquire innovation or invention wherever it is economical and timely to do so.

Trend 12. Intellectual Property: For almost a decade, the ability to monetize intellectual property (IP) has been increasing. Each year there are public auctions where companies can buy or sell IP. Company-to-company IP transactions are now an everyday norm. Little by little, IP is becoming a tradeable commodity—just like products. Experience is building and making it easier to assign values to both registered and unregistered IP. Soon, business and financial plans will regularly include forecasts for both products and the IP in those products. Many companies will elect to monetize the IP and not build anything. Folks in research and advanced engineering who are not generally involved in executing business plans—in other words, those who create IP—will also gradually be drawn into the financial cycle. md

THERE WAS AN ERROR in Bradford Goldense's Jan. article. In Trend 6, the sentence "Functional competencies, on the other hand, are the many skills and capabilities a company needs to make use of its core competencies such as HR, accounting, and the mailroom," should read: "Functional competencies are the dozens of specific technical and business skill sets across marketing, engineering, materials, and production that get a product out the door." *MD* apologizes for the error, and the online version of the article has been corrected.