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The Metric behind the Slogan by Michael Schrage

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begin to understand the true environmental impact.

Today's enterprise resource planning (ERP) systems capture product information, pricing, and stock levels dynamically. But they provide no information about the environmental impact of our business activities. We need information systems that can add up the environmental cost of the product. And we need to do this inside and outside the company, gathering data upstream from suppliers and downstream from customers.

Call it an "environmental impact planning" (EIP) system, which goes beyond just monitoring and measuring. Much as ERP and business performance management networks attempt to keep track of numerous aspects of the financial lives of companies, an EIP system would gauge both the inputs and the outputs that make up a company's environmental footprint. That would require it to partake of some aspects of supply chain management, tracking not just the location of the materials and components that go into a finished product, but their environmental costs as well. Even procurement systems could play a part, offering pricing information on the supplies and materials that companies use and, alongside it, data on the environmental price of one supplier's materials versus another's.

Similar to many cutting-edge supply chain and performance management systems, an EIP system might present the information that it collects in the form of a dashboard, showing the current impact and costs of a particular product line, and how supply and distribution alternatives might affect those criteria. The more complete that

information is, the better the EIP system would be at recommending realistic trade-offs in production that would help the corporation to reduce its environmental footprint. We are starting to see early forms of such systems today, but only in limited applications — power companies, for instance, are beginning to install environmental impact monitoring equipment at their power plants, which help them to balance the trade-offs between fuel sources, energy production, and CO₂ output.

EIP data could be fed into sales systems next to traditional cost information to enable holistic product pricing — extending pricing beyond a dollar amount to something that tells the consumer what the environmental impact of the product is, and thus allowing the consumer to compare products accurately. Companies that differentiate their products not just by price, branding, and features but also by their environmental impact can have a greater impact on consumer choices. With 50 percent of consumers today considering the environment in their product selec-

tion, a company that can compete on a complete environmental impact basis could rapidly capture market share. This is where green IT moves from being a cost play to a revenue play.

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The Metric behind the Slogan

by Michael Schrage

Although history celebrates James Watt as the mechanical genius whose steam engines launched the Industrial Revolution, Watt's most enduring innovation reflects an even greater penchant for marketing. He invented horsepower — the metric

and meme that effectively defined his industry. Most important, Watt's neologism has outlived every engine he designed or built.

The term *horsepower* represented clever rhetorical engineering by Watt and partner Matthew Boulton, whose business had prospered by charging mine owners only one-third of the cost savings achieved by

replacing less-efficient Newcomen steam engines with their own.

Seeking to broaden their market, the collaborators thought brewmasters might find value in this new production technology. But 18th-century British breweries used horses — not steam — to power the turning of their mills' grindstones. So it behooved Boulton and Watt to recalculate their steam engines' appeal accordingly. After a period of equine observation, Watt determined that the typical coal-mine pony could pull 22,000 foot-pounds per minute. To extrapolate this finding to a large horse, Watt increased these test results by 50 percent — i.e., 33,000 foot-pounds of work per minute — and called it horsepower.

Some historians believe that Watt overstated the amount of power that a horse can deliver over a

and “functionality” to attract consumers to products and services. By creating fresh language for the way people calibrate the worth and efficacy of a particular idea, innovative metrics have the potential to be so intrinsically compelling — or at least so creatively marketed — that they become, like horsepower, the overriding identity of a product or brand. Which means, in turn, that these metrics should be crafted with the same singular sensibility as the inventions themselves.

Though that may seem a high bar to reach, devising innovative metrics can be a remarkably low-tech endeavor. For example, in the 1880s, Harley Procter, a son of the cofounder of Procter & Gamble, merely examined a laboratory analysis to add up the ingredients in Ivory Soap that didn't fall into the category of pure soap; he learned that

metric. He conducted elaborate studies examining the complex relationships between moisture in the air and ambient temperature and studied the effectiveness of various types of cooling technology on them. Armed with extensive charts and scores of formulas, Carrier presented his work on the performance of air-conditioning methods in a 1911 paper, “Rational Psychrometric Formulae.” This one paper established air-conditioning as a new engineering discipline. Carrier's technologies were particularly eye-opening because they not only managed humidity levels but did so with the accuracy of a thermostat controlling temperature. Based on Carrier's calculations and his new equipment born of this research, prospects were persuaded to pay large sums not only to cool overheated factories but to, for the first time, “condition” — remove unwanted moisture from — their fetid air in hopes of improving production quality.

The creative challenge posed by formulating innovative metrics shouldn't be confused with “unique selling propositions” that proclaim a product's unparalleled characteristics to convince a customer to switch brands. The purpose of innovative metrics is not to “sell” the innovation but instead to empower customers to calculate for themselves whether the innovation represents good value — *along dimensions the innovator has defined*. Ideally, these dimensions reflect the special competences of the innovator.

Sometimes an innovative metric is a fungible concept that can evolve as rapidly as the technology it seeks to market. For example, in the early 1970s, semiconductor pioneer Intel declared MIPS — mil-

The metric “99–44/100% Pure,” rooted, like horsepower, in a simple calculation, spurred Procter & Gamble's success.

sustained period of time. Nonetheless, his comparison of steam engine output to a team of horses working together proved to be a remarkably persuasive marketing metric for prospective purchasers, whether brewers, millers, or mine owners. Horsepower became a global standard that helped build the Boulton & Watt brand and business.

This notion of using innovative metrics — measures that gauge the unique value inherent in an innovation as a means of marketing it — goes well beyond the traditional approach of adding new “features”

taken together these ingredients equaled 56/100 of 1 percent of Ivory. He subtracted that number from 100 and wrote the slogan “99–44/100% Pure.” That metric — rooted, like horsepower, in a simple empirical calculation — became an integral ingredient of the soap's brand equity and in many ways spurred Procter & Gamble's future success.

By contrast, Willis Carrier — the entrepreneur most responsible for the commercialization of air-conditioning — chose a far more sophisticated path to an innovative

lions of instructions per second — the high-performance standard. Within a decade, Intel had upped the ante and embraced a new, faster innovative metric: “clock speed” — the rates, usually in megahertz and gigahertz, at which processors execute instructions.

But Intel’s emphasis on clock speed led to a problem that the company was slow to recognize: The

to better manage their multibillion-dollar portfolios of innovative financial products such as collateralized debt and subprime mortgages. These metrics would also provide institutional investors and traders a variety of ways to assess their exposure to risk. Yet as the subprime mortgage financial meltdown stunningly affirmed, these models created more risk than value. With the

late comparisons between automobile mileage performance. They found most people surveyed ranked an improvement from 34 to 50 mpg as using less gas over 10,000 miles than an improvement from 18 to 28 mpg over 10,000 miles — even though the latter saves twice as much fuel. (Going from 34 to 50 mpg saves 94 gallons; but going from 18 to 28 mpg saves 198 gallons.) These mistaken impressions were corrected when fuel efficiency was expressed more directly in gallons used per 100 miles. Viewed that way, 18 mpg becomes 5.5 gallons per 100 miles and 28 mpg translates to 3.6 gallons.

As the late mathematician Richard Hamming tartly observed, “The purpose of computing is insight, not numbers.” That’s also the goal of innovative metrics. The measure of the success of innovative metrics is how clearly they convey the value — and risks — of the innovation. Watt’s steam engines, P&G’s soap, and Intel’s microprocessors might well have dominated their markets without novel metrics. But for these businesses and many others, innovative metrics made selling their products to a large number of customers a much less difficult prospect. Indeed, as many innovators are learning, oftentimes the best way to take the measure of a new market is to create a new measure for the market. +

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The new metric “gallons per 100 miles” compares mileage performance more clearly than miles per gallon.

chips got too hot too fast and consumed an exorbitant amount of energy. Finally giving in to customer complaints — and after having lost some customers to rivals who had more energy-efficient chips — Intel recently changed the innovative metric again, this time to “performance per unit of energy.” And upon doing that, Intel positioned its “multicore” architecture, which essentially stacks two or more processors on the same single integrated circuit, as providing the best balance of computational performance and energy use. In other words, chips, previously defined by speed and performance, are now measured by performance and power — and, as important, by energy efficiency.

When innovative metrics prove unreliable, they may end up discouraging the very innovations they sought to promote. That could indeed be the situation that financial-services firms now face. Many lenders adopted innovative metrics such as “value at risk” and “extreme value theory” — ostensibly

enormous losses sustained by so many “innovative” lenders, investors are likely to think twice before they trust the metrics offered by some financial-services firms to sell their novel products and services.

Emerging trends typically invite innovative metrics. For example, a large number of companies worldwide are currently seeking innovative metrics that let them assess — and communicate — the environmental impact of new products or services that they bring to market. Consequently, innovative metrics concerning recyclability and reuse seem destined to become contemporary counterparts to Procter & Gamble’s late-19th-century “99-44/100% Pure” innovation branding.

An intriguing example of a possible “greenovation” metric is the nascent shift from “miles per gallon” to “gallons per 100 miles.” Duke University researchers Richard Larrick and Jack Soll argue that “miles per gallon” metrics make it too easy for consumers to miscalcu-

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