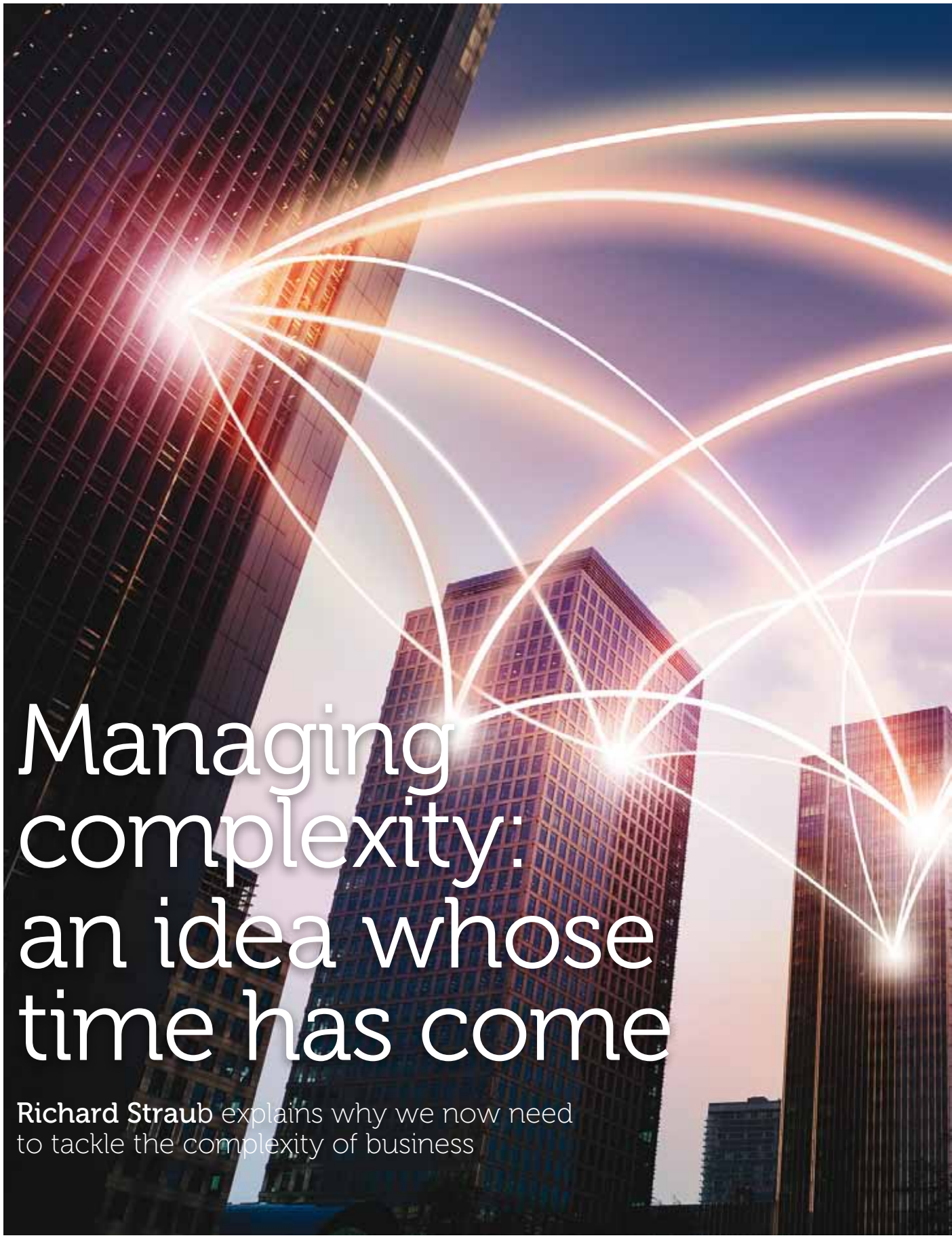

Managing complexity: an idea whose time has come

Richard Straub explains why we now need to tackle the complexity of business

> *Our world is increasingly subject to failures that require systems-level and cross-systems-level thinking and approaches. The consequences of any decision can ripple with unprecedented speed across business ecosystems the way the crisis has impacted nearly every market. For CEOs and their organisations, avoiding complexity is not an option – the choice comes in how they respond to it.*
>
> **IBM CEO Study**
> "Capitalizing on Complexity"

We may have different visions about the future. Few, however, would doubt that the world has become more complex in recent decades and that it continues this journey at an accelerating and—for many of us—unsettling pace. With digitisation, the interconnectivity between people and things (software "talking" to software) has exploded. Dense, global networks now define the technical, social and economic landscape. This interconnectedness and interdependency brings about entirely new risks, as well as opportunities, at every level.

A scholarly interest in complexity, as a subject unto itself, began in earnest some 30 years ago. This was when, for example, researchers at the University of St Gallen in Switzerland developed a management model based on Systems Thinking. Popular literature propagated "complexity theory"—in particular, the notion of the "butterfly effect" by which a small event in a remote part of the world (such as the flap of a butterfly's wings) could trigger a chain of events that would add up to a huge disturbance in the larger system (such as a hurricane many thousands of miles away).

With this, managers' eyes were opened to the reality that organisations are not just complicated; they are complex. To be more precise, organisations are complex, adaptive systems because they are made up of humans with brains and, as such, possess learning capabilities.

Peter Senge's landmark 1990 book, *The Fifth Discipline: The Art & Practice of The Learning Organization*, showed the potential for organisations to enhance their learning capacity at a system level and to increase their nimbleness and competitiveness. Senge's bestseller resonated strongly around the world and unleashed a flurry of literature on what was described as a new kind of "learning organisation".

But, in reality, little changed.

This wave of interest in complexity thinking led to few actual new practices being adopted among corporations. Why?

There are, I think, five major reasons for the failure to affect management. At the same time, a deeper look at these impediments also suggests why this long-overdue shift may finally be poised to take place.

It is hard for managers to think multi-dimensionally

Where complexity exists, managers have always created models and mechanisms that wish it away. It is much easier to make decisions with fewer variables and a seemingly straightforward understanding of cause-and-effect.

The notion of "maximising shareholder value," which determines so much corporate behaviour these days, is the perfect example. This school of thought provides clear-cut and "simple" guidance to decision makers and relieves them of considering difficult trade-offs. We know, of course, that constantly dialling down investments to boost short-term profits or divesting assets to show a better return on assets (ROA) number often damages the long-term health of a company. Still, all too many executives play this game.

By contrast, a complexity approach demands that competing values and priorities remain in view — and not just for the good of shareholders but for customers, employees and society at large.

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The good news is that the shareholder-is-all paradigm is showing increasing signs of strain. A growing chorus of thought leaders (including Roger Martin and Stephen Denning) and organisations (such as the Aspen Institute and Conscious Capitalism) are pushing back against the "maximise shareholder value" school. And a growing number of companies — Unilever, Starbucks, Costco and Amazon come quickly to mind — are explicitly embracing a more complex orientation.

Until recently, technology was not powerful enough to capture much complexity

When systems thinkers and theorists turned their attention to the implications for organisations in the 1980s and 1990s, the tools simply did not exist to model their workings at a level that would yield practical insight.

Now, the exponential increase in computing power and the progress in mathematics and statistical analysis have propelled us into a new era. With the ability to draw on "Big Data" and map networks at scales that were unthinkable only a decade or so ago, we can begin to understand communication flows through large organisations, as well as the impact of disturbances and managerial interventions on these flows.

What is more, the increasing ability of individuals and teams to connect through enterprise social media may lead, at last, to the widespread flowering of the learning organisation. By leveraging instant messaging, blogs, wikis and other platforms, more and more companies are creating living networks where knowledge is generated and then flows across organisational silos in unprecedented ways and at unprecedented speeds.

Too often in the past we have ignored the human element

Although it has taken time for the technology to emerge that is allowing us to better cope with complexity, many managers have been leery to even try because of a nagging concern: Might we reach a tipping point when human brainpower becomes obsolete? Might robots or computers, as Ray Kurzweil suggests, supplant the knowledge worker?

For many of us, this is a disturbing thought because we have seen so many of the models designed to predict the future state of complex systems (from economies to climates) fall far short of accuracy.

The eager futurists talking about machines taking over evaluation of situations and decision making have set back their own cause, as others see them ignoring an essential fact: sense-making is always informed by values. The idea that we might look for value judgments from algorithms is badly flawed if not downright dangerous.

Fortunately, there is a growing recognition that, while computers can provide our brains with enormous extensions of its storage and processing capacity, machines must remain only inputs to human reasoning.

It is in our minds — often in communication with other minds — where the ultimate evaluation and deliberation must continue to take place. The brain is the very best "complexity processor" and itself our most complex organ.

For managers, new skills are becoming essential to manage all of this Big Data: to determine what the analytics should be solving, to decide what information is truly relevant to the enterprise and what simply constitutes "noise," and to make critical value judgments about privacy and security.

In the end, we are slowly recognising that technology alone cannot solve the knottiest problems in complex organisations. The machine must be in service to human beings — not the other way around.

We have confused the truly "complex" with the merely "complicated"

It is crucial that decision makers understand the difference between a complicated problem and a complex one because the two require different strategies and tools.

Sometimes a problem will morph from one state to the other — either from complicated to complex or vice versa — and so managers need to be ready to adapt their approaches accordingly. They are largely not interchangeable.

How are these concepts different?

In their 2011 *Harvard Business Review* article "Learning to Live with Complexity," Gokce Sargut and Rita Gunther McGrath offer this fundamental distinction: "The main difference between complicated and complex systems is that with the former, one can usually predict outcomes by knowing the starting conditions. In a complex system, the same starting conditions can produce different outcomes, depending on interactions of the elements in the system".

The move from linear thinking to complexity is indeed a paradigm shift. It may be comparable with the move from Newton's physics to Einstein's. Newton's laws did not disappear with Einstein's revolutionary discoveries but Einstein opened the door to an entirely new world — unseen before.

In this sense, complexity must become our worldview — a basic mindset guiding us in our assessments of situations and decisions. It should make us more humble and more alert. It should open our minds. It should spur an awareness that too often our linear interventions do not achieve what we want, and may even result in unintended consequences.

We have much more work to do to understand the difference between the complicated and the complex. But we are at least beginning to create a common language around these ideas.

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Many managers have not found "the innovation fulcrum"

In their quest for double-digit growth in single-digit markets, many companies are finding themselves in an almost unmanageable state of complexity — one that they often do not realise is of their own making.

This "Complexity Crisis," as John Marotti calls it in his book of the same name, is caused by a runaway proliferation of products, customers, markets, suppliers, services and locations. All of these add costs, which go untracked by even the best of modern accounting systems. Complexity also tends to fragment management focus. The Complexity Crisis thus becomes a hidden profit drain for many companies today and it remains under the radar screen of those who cause it.

As bad as this situation is for business, it might be even worse for government. In a number of European countries, including Austria, Belgium and France, the government's share of GDP now exceeds 50%. And this does not include the hidden costs to the private sector that are imposed by any bloated public administration, with its flawed regulations and convoluted tax systems.

In their 2005 *Harvard Business Review* article "Innovation Versus Complexity: What Is Too Much of a Good Thing?" Mark Gottfredson and Keith Aspinall explain that organisations must decide how much innovation is appropriate before it leads to needless, or even damaging, complexity. The goal is for managers to find "the innovation fulcrum" — the pivot point where innovation suddenly tips over into complexity.

The authors put it as follows: "The pursuit of innovation can be taken too far. As a company increases the pace of innovation, its profitability often begins to stagnate or even erode. The reason can be summed up in one word: complexity. The continual launch of new products and line extensions adds complexity throughout a company's operations, and, as the costs of managing that complexity multiply, margins shrink".

Peter Drucker recognised the same phenomenon.

50%

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> *Stripping out unnecessary complexity from products and services has become a major movement in emerging markets – so-called "frugal innovation" has led to stunning results in fields such as mobile devices and medical equipment*

In his classic 1963 *Harvard Business Review* article "Managing for Business Effectiveness," he asserted that clarity of focus is critical in allocating resources, which is the essential job of management. The hard part of innovation is sorting out which ideas should make the cut — and which should be abandoned.

Not everyone, thankfully, is failing in this exercise. Stripping out unnecessary complexity from products and services — and targeting them to specific customer needs (including affordability) — has become a major movement in emerging markets. So-called "frugal innovation" has led to stunning results in fields such as mobile devices and medical equipment.

Some of these products, having proven themselves, are now being shipped to more developed markets. This "reverse innovation" may well show us the way to a better future.

The awareness of the complexity challenge among managers has increased significantly during the past 10 years. Tools and techniques to better understand and help navigate complex systems have reached a state of operational readiness. Good thinking about ways to navigate or even embrace complexity is now available.

Yet most management practices are still anchored in the pre-complexity world. The pioneers who not only preach but also apply new complexity-tested management methods and tools such as Fredmund Malik, a pioneer of Cybernetics-based management and the Scrum Alliance in the field of complex projects are the exception rather than the rule.

For years, Gary Hamel has been the most vocal proponent of a new management paradigm. In his *Harvard Business Review* article "Moon Shots for Management," he and a group of prominent thinkers and business leaders (including the late CK Prahalad, Julian Birkinshaw, Tim Brown, Yves Doz, Henry Mintzberg, Vineet Nayar and Peter Senge) jointly define a set of grand challenges to move management out of its bureaucratic and hierarchical ghetto.

Were Drucker still alive, I assume he would have added his voice as well, for his foundational ideas and ideals are in line with most of the specific solutions posited in the piece: offering more autonomy to knowledge workers, seeing leaders play more of an enabling role, fostering trust throughout the organisation, achieving clarity of focus and direction of the organisation, providing a diversity of views, unleashing the human imagination and cultivating systems-thinking skills.

With the implementation of these principles, organisations can finally evolve from *complicated* entities, marked by clearly defined functional borderlines, towards *adaptive complex learning systems*.

But achieving such a "managerial moon shot" will not be easy; as far as we've come, it still requires a huge earthly effort from all of us.

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