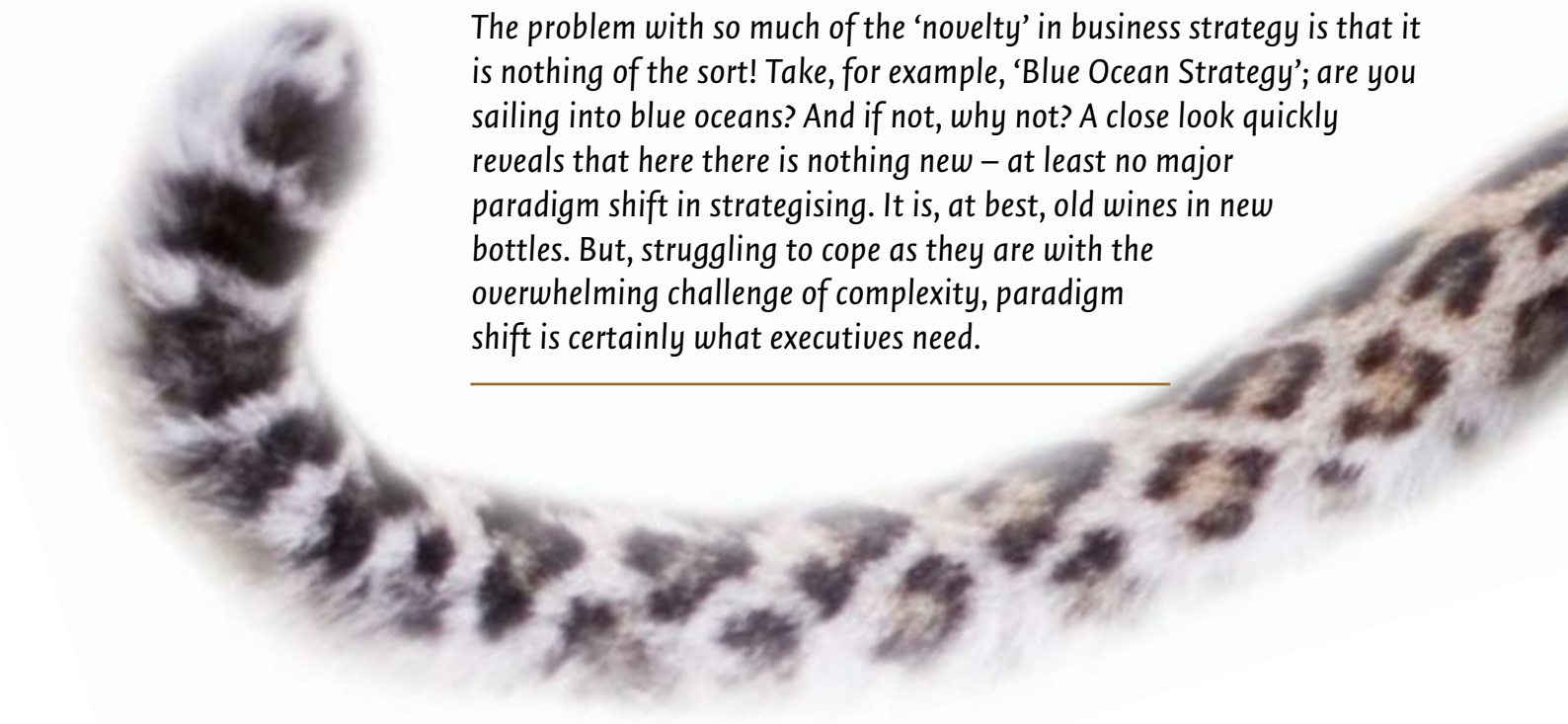
How power laws may shape the face of corporate strategy



The problem with so much of the 'novelty' in business strategy is that it is nothing of the sort! Take, for example, 'Blue Ocean Strategy'; are you sailing into blue oceans? And if not, why not? A close look quickly reveals that here there is nothing new – at least no major paradigm shift in strategising. It is, at best, old wines in new bottles. But, struggling to cope as they are with the overwhelming challenge of complexity, paradigm shift is certainly what executives need.

By Wolfgang Amann,
Cuno Pümpin &
Didier Sornette

THE RISE OF COMPLEXITY

The origins of complexity are themselves complex. First there's internal and external 'diversity'. Internal diversity has its origins in the (internationalising) HR pool, variation in management systems and different ways of articulation as both means and ends - ranging from simple financial goals to a more comprehensive view, and parallel business models for different types of business units. External diversity flows from heterogeneous cultural values in the various markets served, and from a plethora of stakeholders with different interests (investors, employees, regulators, customers, etc.). Then there's 'interdependence', which companies have to manage globally to an unprecedented degree. The less clear-cut a company's boundaries become, the more opportunity there is for complex cross-company, cross-stakeholder networks and the more the company is exposed to impacts on the value chain flow due to mistakes, frictions, reverse trends, or even shocks.

Ambiguity multiplies as the business world sinks beneath a glut of information. Financial figures offer less and less certainty as a multiplicity of accounting standards renders them ambiguous. Mounting uncertainty has made studies, scenarios, survey results, and reports less reliable. Cause-effect relationships have become difficult to determine. Rapid change complicates management. True ambiguity has reached its zenith and even if managers seem to find solutions to interdependence, diversity and ambiguity for their specific company, industry, and personal situation, the solutions may no longer apply the following day. Individually, these challenges are familiar to managers; together, they create complex, interconnected and dynamic systems in which firms struggle to operate. And the bad news is that complexity is increasing.

THINKING ABOUT COMPLEXITY

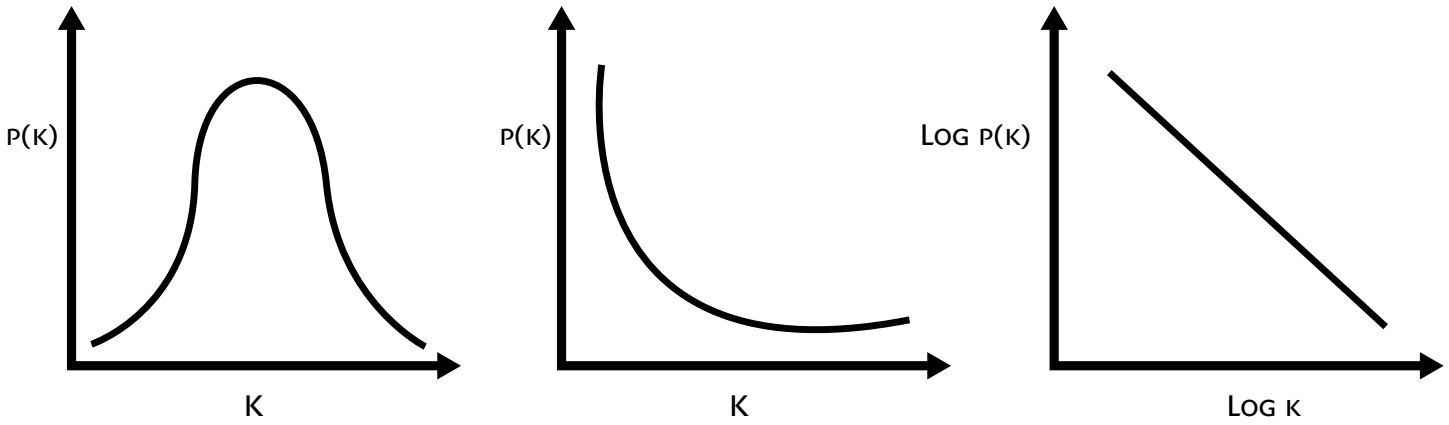
The good news is that while complex systems may be a new challenge to traditional business thinking, other disciplines (such as physics or neuroscience) have spent decades thinking about them. Perhaps we can learn from them. To the scientist, a complex system is simply defined as a system with a large number of mutually interacting parts, open to their environment, which self-organise their internal structures and their dynamics with novel and sometimes surprising macroscopic 'emergent' properties. And confronted by such complexity, the rule for any coping strategy is simply this: that its own complexity has to be at least equal to the internal and external environments' complexity. The following strategy is based on one of the most important characteristics of complex systems, namely the emergence of many hierarchies of scale as quantified by so-called 'power law' distributions.

THE NATURE OF COMPLEX SYSTEMS

Imagine a 'normal distribution curve' – the traditional bell-shaped graph that assumes that the likelihood of a given event's occurrence is centred on an expectancy value and cannot deviate much from it. This distribution has no 'fat tails' – rather the ends of the bell shape both seem practically to converge with the horizontal axis. Until recently, this curve (with its view of systems as basically 'stable', if not necessarily 'static', and with extreme events very unlikely to happen) was assumed to be the basis for any quantitative approach to complicated situations. And in a world made up of many decoupled agents, parts or persons, whose overall output is the *sum* of independent contributions and behaviours, the model works. But does it hold true in the midst of real complexity where there is constant flux with non-negligible interactions and dependences between its elements (agents, people, firms etc.)? Here so-called 'power-law' distributions emerge. These have no 'vertex' – as is the case in the bell curve – but instead show a continuous descent from the highest point, and what – in the language of 'power laws' in mathematics or physics – are commonly called 'long tails'.

> The New York Stock Exchange crash in October 1987 is a good example of the limitation of the 'normal distribution' model and its associated concept of 'standard deviation' (often referred to as 'sigma'). In theory it shouldn't have happened. The amplitude of loss of 21.6% in one day was supposed - based on share prices' *expected* standard deviations - to occur only every 44,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000 years, or 44x1099 years. The assumed age of the universe is 10x109 years - a much smaller value. Logic therefore suggests that such a crash was nigh on impossible! But happen it did. In fact on Wall Street one hears, every few years, of '9 sigma events'; according to the 'normal distribution' curve, an event which is 9 standard deviations away from the central value has a probability of only one in 2x1019 of occurring - that is a cycle time of 3 trillion years! The subprime crisis (another highly 'unlikely' event) is currently costing billions and soon more than a trillion Euros.

FIGURE 1: NORMAL DISTRIBUTION (LEFT PANEL) VERSUS POWER-LAW DISTRIBUTIONS (MIDDLE AND RIGHT PANELS)



Because 'fat tail' curves do not converge as rapidly with their axis there is no central value or standard deviation and the frequency of large and even extreme events remains relatively large. There is a coexistence both of many small events (the 'long tail') and of the relatively large frequency of systemic events (the 'fat tail', also known in mathematics as the 'heavy tail'). Power laws appear linear in double logarithmic scales. The contrasting shapes of these graphs are shown in Figure 1. where earthquakes, landslides and mountain collapses, weather and climate changes, forest fires, hurricane losses, rain events, pharmaceutical sales, health care costs, terrorist intensities, war sizes, hits on websites, firm sizes, and stock markets are under scrutiny, 'power laws' apply.

Where do power law dynamics come into play in the business world? Perhaps the most obvious places with a bearing on corporate strategy are in mechanisms involving networks of people - so-called 'agents' in the power law logic - acting within firms, between firms and outside firms. Threshold dynamics between coupled agents create power and tension, leading to domino-effects cascading into avalanches. Such is the pattern when rumours or innovations spread within firms. Another pattern is 'proportional growth' or 'growth by preferential attachment', when an emerging solution (and the respective hero or heroine promoting it) are joined by more individuals ('The Bandwagon Effect'). Within these patterns and mechanisms, highly connected nodes dominate and control the network organisation. Managers positioned as 'hubs' with many connections to other people thus have a clear information advantage, both in the sense of receiving and sharing information, and are in a position to detect crises early. Truly successful 'knots' show certain characteristics, such as early bird behaviour and fitness in terms of better communication skills and extensive contacts.

HOW POWER LAWS CAN SHAPE STRATEGY

Where 'power laws' are at play it is questionable whether traditional thinking in traditional product-market or competency-market combinations will still provide companies with the best solution. We would argue that *real* strategic innovation may come from refocusing strategy on a network-centric and power-law-focused attempt to outpace competition. Going beyond competencies, capabilities and resources, truly modern strategies aim to improve network structures and processes. They ought to include the vocabulary and logic of power laws in the actual strategy documents, but more importantly in the reasoning process that lies behind them. Such strategy documents do not only outline a company's overall vision, but also the core networks that will be used, the type of intended communication and interaction strategy for each sub-network, and the structural holes that control access

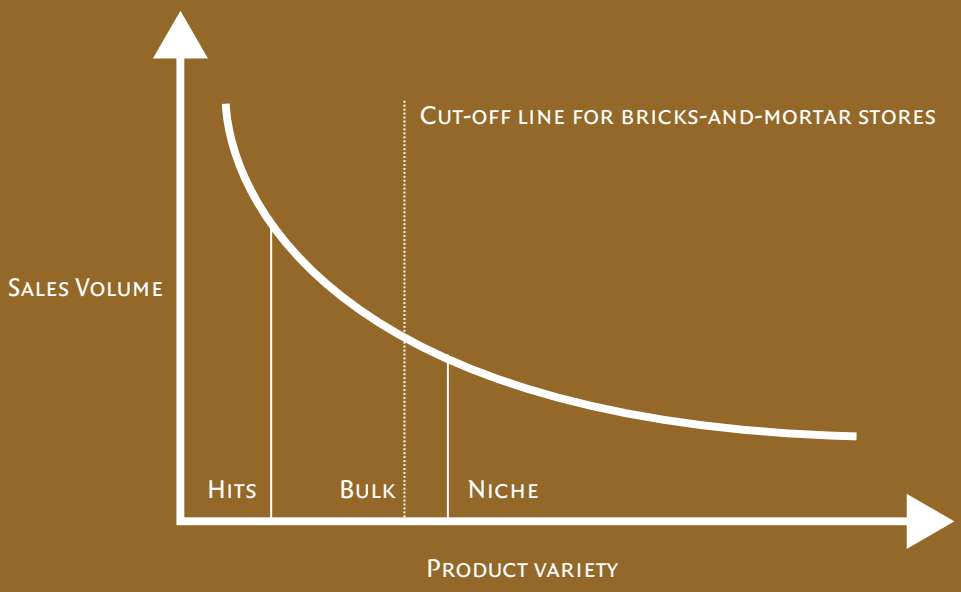
Amazon shows that Internet value is not only based on transactional efficiency, but on 'long tail' economics.

to further networks. In order to allow complexity to be managed, opportunities for self-organisation, experimentation, and the modularity of explosive growth opportunities have to be anticipated. Mastering phase transitions has emerged as a key challenge. Change usually starts slowly, followed by a greatly accelerating growth period, eventually leading to a burnout phase. But in networks with power law behaviour this does not necessarily lead to saturation, but rather to the birth of the next innovation and a virtuous circle of innovations and adaptations. The system never really reaches equilibrium any more – and this can be seen in distribution curves relating to innovation, company growth, or news spreading within companies. Nevertheless, wise network strategies always bear in mind that each system is finite. As markets, segments, network sizes, budgets and time are limited, explosive growth eventually reaches its limit when networks have been fully exploited.

AN EXAMPLE OF THE RISE OF 'LONG TAILS' IN THE ONLINE WORLD

Figure 2 shows the 'fat tail' of a power law in the left part near the vertical axis. Movies released in a year are ranked according to their success in terms of sales. 'Blockbusters' generate high returns and are citizens of the fat tail. 'Pirates of the Caribbean' - the only real blockbuster in 2006 - generated more than a billion USD at ticket offices. On the graph, blockbusters inhabit the left part. Industries dominated by the 'fat tail' rely on a few rare blockbusters. Traditional movie theatres depend strongly on these and, in general, can't afford to show films for too narrow a target group. Practically any mainstream 'bricks-and-mortar' store would have to draw the line somewhere between 'fat' and 'long tails' and limit its offering. Amazon, by contrast, which can offer millions of books in comparison to the limited offer of even the largest W.H. Smith bookshops, is a classic example of a company exploiting the 'long tail'. The average Barnes & Noble carries 130,000 titles, while more than half of Amazon's book sales come from outside its top 130,000 titles. The real potential for new business models lies in surpassing an offer that is not limited by physical space. The best growth opportunities more often lie at the intersection of multiple entities than in single visionaries acting on their own. Open source developments or decentralised innovation, content creation and compilation are just some examples. Users, when empowered by technology, will innovate more quickly and effectively than, for example, their vendors will.

FIGURE 2: THE INTEGRATION OF FAT TAILS AND LONG TAILS ENABLES NEW BUSINESS OPPORTUNITIES



AN EXAMPLE IN THE OFFLINE WORLD: NETWORK ORIENTATION AT UNILEVER IN INDIA

In 2001 Unilever started a new network-based strategy to conquer non-urban markets. Their innovative idea was to see whether women living under the line of poverty in India could be activated to distribute Unilever products by means of door-to-door visits in their own or neighbouring villages.

There were great challenges: few local stores, logistics, the lack of roads and storage facilities, and because in remote regions modern consumer products and their correct use were generally unknown, Unilever needed to provide product demonstrations. They targeted women (to whom, because of Indian men's dominant role in the society, educational opportunity was usually unavailable) to receive training, and these self-employed women (SEW) were then free to experiment and decide which products sold best.

Unilever's pioneering endeavour resulted in astonishing success and in the creation of networks of loyal customers and a loyal sales force. The networks are currently operating

in a scale-free environment and are enjoying explosive growth. The number of SEW in this scheme will be increased from 13,000 in 2006 to 100,000 by 2010. They will then supply 500,000 villages and up to 500 million people. While the precise level of the considerable economic benefit enjoyed by Unilever as a result is a well kept secret, what is known is that SEW have so far doubled their monthly household income to 750 Rupees or 14 Euros. What this shows is that in the non-digital world too, the mastering of networks and ensuring scale-free growth can bear enormous fruit.

CONCLUSION

In the past, although variables such as size, heritage and past success sometimes made adaptation difficult, companies attempted to become more market oriented; we would argue that a modern, holistic approach would see companies becoming not 'market-driven', but 'market-driving'. To achieve this, principles from power law thinking need to enter the strategising process – and this in turn means that managers need to learn new ways of thinking from the natural sciences. Such thinking might just allow the first real paradigm shifts in business strategising for years.

Several insights emerge:

First, all businesses still built on the logic of hits, blockbusters and 'A products' as identified in traditional A-B-C analyses, will see new competitors emerging who will focus on exploiting the 'long tail', or an integrated view of the 'fat' and 'long tails'. The Amazon example shows that Internet value is not only based on transactional efficiency, but on 'long tail' economics. If hit-oriented companies simply built their organisations on non-power law logic, their administrative heritage would, in time, become a liability.

Second, as consumers' purchasing power is limited, they will start spending a fair share on accessible niche products.

Third, consumer-generated content and distribution efforts will gain importance, and this will call for network engagement strategies.

Fourth, past-future trend extrapolations will gradually become very unreliable. Information is spreading more rapidly, consequently making change possible at an equally swift rate. Shifts in industry logics and the rise of new technologies usually attract new players who challenge even the most powerful and established companies. Fifth, if firms can own emerging networks, first mover advantages can really pay off. Unilever conquered previously hard-to-penetrate rural India to achieve a sustainable competitive advantage. Complexity is only going to increase with time. Traditional planning procedures based on yesterday's risk analysis and normal distribution curves fall short in explaining today's crises and opportunities. Companies and managers opening their minds towards power laws and network dynamics become substantially better prepared for system shocks, growth opportunities, phase transitions and the complexity that will inevitably continue to increase with the growth of globalisation, interdependent markets, firms and people.

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About the authors

Wolfgang Amann *is a faculty member and Executive Director of the St.Gallen MBA Program at the University of St.Gallen in Switzerland.*

Cuno Pümpin *is Chairman of Invision AG, a Zug-based Private Equity Investor, and professor em. at the University of St.Gallen*

Didier Sornette *University of St.Gallen, Professor on the Chair of Entrepreneurial Risks at the Department of Management, Technology and Economics, ETH Zurich*

Contact the authors through My Criticaleye.