



Getting to grips with business complexity

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Many companies suffer from increasing complexity. Common sense says - and empirical research confirms - that complexity increases costs, both direct and indirect. So the cry goes out "We must reduce complexity!" But while that sounds quite feasible, it isn't that easy - and the cost benefit may be more than eliminated by a revenue hit. This document highlights some of the reasons why, and suggests some steps to get a proper handle on the issue.

"For every complex problem there is an answer that is clear, simple, and wrong"

- H. L. Mencken

A Sudoku puzzle is complicated but not complex. There is only one success measure – solving the puzzle or not – and the unknowns are all "known unknowns" within a narrow range (numbers from 1 to 9). There are no sudden hidden surprises.

Baseball and football, by contrast, are more complex because although the rules are fairly simple there are many more possible plays and combinations of plays, and there are the opponents who behave in unpredictable ways. There are hundreds of possible outcomes, though these simplify finally into a binary win/lose.

Similarly some elements of business are complicated but not complex – assembling a car, scheduling an oil refinery, organizing an international shipment – though of course like anything in real life these all do have the possibility of sudden hidden surprises.

Complexity occurs when there are many degrees of freedom for choice, significant uncertainty even about the current situation, many potential outcomes, many dimensions of possible performance, and many "unknown unknowns". So, for example, a sales call may not be particularly complicated, but the customer will

have many different needs – explicit and unstated – the salesperson will have many choices about how to interact and respond, and many outcomes are possible. The success of the call may be measured by several dimensions of financial impact, customer satisfaction, requests for future quotes, market intelligence, industry references, etc.

Management is mostly about coping with, and indeed taking advantage of, complexity. If we want to be scientific about management, we therefore need to be scientific about complexity, and that means measurement. So is there any way to measure complexity?

The knowledge and the results of analysis of thousands of business units from across all sectors are held within our cross-industry and industry specific databases at our customers' disposal.

PIMS uses this unique source of empirical evidence to map out appropriate strategies, benchmarking performances and delivering results.

We have evolved from a multi-company research programme under the wing of Harvard Business School to a centre of expertise within Switzerland's top Management Centre, to a London-based consultancy, advising companies around the world.



Defining complexity

“We must dare to think ‘unthinkable’ thoughts. We must learn to explore all the options and possibilities that confront us in a complex and rapidly changing world.”

- James W. Fulbright

Complexity is often defined as the log of the number of possible states of a system. It is a general law of physical systems that over time complexity and chaos naturally increase, while the ability to get useful results decreases. Many companies feel themselves victims of such forces. We face many different dimensions of complexity:

1. Offer complexity
2. End customer complexity
3. Channel complexity
4. Media complexity
5. Product complexity
6. Geographical complexity
7. Cultural complexity
8. IT complexity
9. Network complexity
10. Supply chain complexity.

We have evidence that complexity increases costs, both direct and indirect. Complexity makes it more difficult to manage and grow a company, and diffuses our capacity to exploit a competitive advantage. Taking the dimensions of complexity in turn:

Offer complexity

As each company has grown and developed, and had different degrees of success and failure in different markets, we have inevitably found ourselves managing many different brands in many different categories and countries, with many differing product variants tailored to particular end customer needs, and many different pack sizes and types. Each SKU exists because a loyal group of end customers prefer it to everything else, so efforts at rationalization will alienate such customers and we may well lose them to a competitor. The likelihood of losing them will depend on whether we are asking them to switch just a pack format, or a superficial product aesthetic, or a brand name, or a genuine product specification, or a distribution channel. At the same time our product developers (or our competitors) come up with new and more appealing offerings, which push us into ever more complexity.

There is also the complexity of having different prices and commercial terms even for the same SKU, depending on context, associated services, payment options, etc. Each such decision piles up complications for the future in exchange for a momentary advantage now.

End customer complexity

Marketers are getting better and better at identifying the specific needs and desires of different end customer groups, and the different occasions on which the products are purchased and/or consumed. It is no longer enough to split consumers by age/sex/socioeconomic group, or industrial customers by industry – we are looking for the most meaningful clusterings of end customers and buying occasions according to needs, desires, and how our offering is valued versus competitors. This allows us to tailor and target different offerings to optimize such values and preferences, and occasionally bundle multiple products together to best exploit our advantage. But it also adds a new dimension of complexity.

Channel complexity

Consumers may come across fmcg offerings in a supermarket, a convenience store, a specialist retailer, on the internet, or as part of a third party's service offering (restaurant/hotel/garage/hairdresser etc.). Business-to-business customers can be reached both directly and via different kinds of distributor/reseller/packager. Channel proliferation only goes one way: that of more complexity. Yet that is the result of increasing sophistication in everyone's lives, and increasing human ingenuity in finding commercial opportunities – not something that can be reversed. Either we tailor offerings to best meet the needs of each new channel, or we leave part of the playing field uncontested for our competitors.

Media complexity

This has been a traumatic shift over the last ten years, with the rise of the internet and social and other non-traditional media, all requiring dramatically different approaches to engage and inform customers. We have to tailor our message (and sometimes two-way interaction) specifically for each medium and each customer cluster, while maintaining overall brand coherence and identity. In general, the narrower the medium the more targeted, powerful and cost-effective the message can be, so we don't want to forego these opportunities. Complexity reduction could mean serious loss of market share.



Product complexity

Product development generally goes one way: more complex products. As we add more pizzazz, better performance in extreme circumstances, better fail-safe user interface, less harm to the environment, etc., we add to the number and complexity of components and raw materials, the amount of testing required, and the amount of user explanation given. This is all necessary to be competitive, but all costs money.

Geographical complexity

For most companies ten years ago, our top five countries accounted for the lion's share of our sales. That is much less true today, with the rise of the BRICs and the reductions in tariff and logistical barriers. We all have to deal with more diverse customers and consumer needs, speak more languages, be sensitive to more cultures, and cope with a wider variety of competitors and time zones. To function at all, we have to have more modes of organizational response, differentiated innovation processes, and globally effective supply chains.

Cultural complexity

Many companies have been formed as the result of mergers and acquisitions, and embrace a diverse heritage of different ways of thinking about the world and of doing things. While this can sometimes be a strength in that it widens the set of possible response mechanisms, it can severely impede the ability of the whole organization to move together to achieve a given strategy.

IT complexity

As time passes, crucial IT systems for enterprise resource management, operations, customer interface and decision support are subject to add-ons driven by needs unforeseen by the original designers. There is constant pressure to integrate previously separate IT systems (for "seamless operation"). The result is a complex edifice held together by hope and sticking plasters; eventually a tipping point will be reached where it all comes crashing down and the enterprise loses crucial functionality. It is very costly to avoid this by starting again from scratch.

Network complexity

Increasingly, our world operates via a dynamic web of peer-to-peer interrelationships, rather than conventional hierarchies. This can be a huge boon when needing quick solutions to complex bundles

of needs, but as we have experienced with our banks it can also lead to damaging feedback loops and sudden crises in unexpected places. Companies in partnership with Lehman Brothers in 2008 suffered untold damage. The more complex and dynamic the network, the greater the risk.

Supply chain complexity

Many of the pressures listed above (particularly offer complexity, product complexity, and geographical complexity) increase our supply chain complexity. But even if we had the same product offer as ten years ago, in the same countries, our supply chain would probably still have to be more complex. Different production facilities in different parts of the world are specialising at being excellent in different slices of the value chain, and we have to get smarter at assembling the best combination of supply sources for each market.

There is then the logistical complexity of how we deal with ever-increasing service demands in terms of rapid delivery time, precise delivery window, small drop size, etc. in a world where more and more options are opening up for different types of fulfilment and distribution organization.

Mechanisms for reducing complexity

"Any intelligent fool can make things bigger and more complex... It takes a touch of genius - and a lot of courage - to move in the opposite direction."
- Albert Einstein

Most organizations are weak in the areas of "birth control" and "mercy killing" to minimize pointless activities, SKUs, pricing options, customer groups, channels, media, product features, geographies, production facilities, depots, etc.. When things get unbearable someone remembers the "80:20 rule" (which says that 80% of sales/profit/good things comes from just 20% of SKUs/customers/advertisements/costly things), so a big effort is made to eliminate all the non-strategic items from the "long tail".

Often forgotten is that in order for this to result in lower costs, a parallel effort is necessary to reduce headcounts, energy consumption, maintenance expenditure, etc. – none of our employees will come in one Monday and announce "there's less work for me to do now, so here's my notice to quit". Quite often, too, the profit possibilities of small, infrequent activities are not properly assessed – and the cost of doing what you spend 80% of your time doing is not addressed.



Intelligent complexity reduction requires a good understanding of the relevant cost drivers, price elasticities, and options for action. Quite often the biggest payoffs are in merging similar offerings in the “top 80%”, and re-pricing rather than eliminating some of the “bottom 20%”.

Culture change initiatives, particularly in post-merger integration situations, often focus on structures and processes more than people. They try to impose a pre-ordained top-down view rather than synthesising a richer world view from the disparate heritages. As a result they are often ineffective and can make complexity worse, not better.

Methods for handling complexity

“The older I get the more wisdom I find in the ancient rule of taking first things first. A process which often reduces the most complex human problem to a manageable proportion.”

- Dwight D. Eisenhower

The information revolution has expanded our ability to handle complexity. We can take a step back from looking at each and every individual case and instead develop algorithms for what to do in response to different types of situation. There are also some general guiding principles in addition to Eisenhower’s above:

1. Decompose the mega-system into autonomous self-organising sub-systems which can treat other parts of the mega-system as “market environments”. The higher-level management job is to ensure performance of, and functional interfaces between, the sub-systems and to scan the environment for “out of the box” innovation opportunities.
2. Defer a tricky decision where you feel you don’t have a strong basis for which direction to go: work on other aspects where you have better grounds for a decision, you will usually find that by the time you return to the original topic the decision is obvious.
3. Look for non-obvious ways of aggregating units which although they may differ in substance have structural similarities such that the decision structures and algorithms can be the same.
4. Use modularisation and common components to achieve high variety from a simplified set of inputs or operations.

Mastering complexity with PIMS (evidence-based management)

“The Law of Requisite Variety: If a system is to be stable the number of states of its control mechanism must be greater than or equal to the number of states in the system being controlled. Only variety can destroy variety.”

- Ross Ashby

PIMS has been collecting data on business performance – and the drivers that make a difference – for over 40 years. Originally the metrics on complexity were relatively simple: relative product line breadth, number of customers and suppliers, relative range of customer sizes/types, geographical spread, degree of customization and other similar metrics. As the database set has grown to include satellites on specific topics we have found ourselves collecting more and more complexity data: number of SKUs, number of components & raw materials, number of QC tests, a matrix of brands x categories etc.

We have worked with many different organizations on post-merger integration, productivity improvement, complexity reduction, marketing spend optimization, innovation strategy, profitability turn-around, and so on. This gives us the pragmatic basis for coming up with workable solutions for better performance.

We feel it is now time to explore, with companies who like to manage on the basis of researched facts, the potential for using evidence-based complexity management tools to help deal with the issues raised in the above discussion. The benefits could include:

1. Better understanding of what constitutes complexity and how to measure it.
2. Evidence on how complexity drives the different elements of cost, growth, and profitability.
3. A handle on the trade-off between reduced cost and deteriorating offer/customer and channel benefit when reducing complexity.
4. Clarity on what types of complexity are “good” and what are “bad” in what situations.
5. Filters and decision models for an “optimal” level of complexity in different areas.
6. Systems and algorithms for intelligent “mercy killing” and “birth control” of unproductive areas



7. Relevant culture change initiatives to streamline organizational responsiveness.

This would be a valuable backup to existing strategic initiatives, without requiring too much time and effort, and with the potential for very rapid payback.

Even for companies that are some way down the road of complexity management, an outside perspective would bring a useful mid-course correction. We would welcome the opportunity to help your organization to get to grips with your specific complexities.