

Pattern Power via Limit-Breaking: A management perspective on AI

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AI has become close to bewildering in its promises, met and unmet, its terms and tools, acronyms, “use” case examples of wild successes countered by duds and disappointments. There’s an overall lack of clear pointers for business leaders to shape the direction, priorities and pace of their organization’s AI activities. This has led to a widely reported gap between executives’ general belief that AI will transform the business landscape and the fragmented and ad hoc projects that are sensible and offer productivity benefits but seem unlikely to transform anything.

Over the past two years, we have explored the widening AI space, from theory to practice, the psychology, biology and social science work on human cognition to the tools and techniques of machine intelligence and the commonalities and management messages from the case examples and survey of successes and failures.

What stood out in our reviews is that there is today a lack of management perspective on AI.

1. ***There is no clear, consistent and complete conception of “Intelligence.”*** That came as a surprise, of course, but it explains many of the muddling elements of AI. A basic general assumption is Intelligence as raw smarts: the equivalent of SAT scores or IQ. There is far less attention paid to how humans build Intelligence to put to use in their daily lives. We found that patterns are at the core of Intelligence: mental models, conceptual maps, categorization, rules of thumb and other ways of literally making sense of information, experience and, yes, raw smarts.
2. ***The roots of Artificial Intelligence continue to be firmly embedded in what we know about Human Intelligence.*** The breakthroughs in machine learning have largely come from increased understanding of the human brain; the mainstream tools reflect this: neural models. The main unresolved challenges of AI basic capabilities center around areas where humans have evolved effective pattern-building pragmatics: causal reasoning, ability to transfer learning from one domain to apply it more generally, “commonsense” and most of all emotive rather than literal understanding of language. (AI today cannot recognize when the simple sentence “My printer is broken” is a statement of fact or a request for help.)
3. ***AI seems to be another instance of the Braudel Rule.*** This is our adaptation of a definition of “progress” by one of the greatest modern historians, Fernand Braudel that has provided immense insight into the dynamics of innovation across centuries, societies and markets. Progress is paced by “changes in the limits of the possible in the structures of everyday life.” We developed this conception in our work in the early 2000s on the coming mobile economy and more recently in our studies of how invention is turned into value-creating innovation.

In examining the progress of AI, we found that it is dominated by breaking the limit on Pattern building and application, and hence on Intelligence put to use. Human cognition is necessarily dominated by limits of memory, speed, time, ability to calculate. Traditional systems have been constrained by limits of programmed rules and procedures. The impact of AI is to break some limit on cognition that creates new possibilities in the patterns of everyday life. Neural models removed limits on learning from experience and data. Many of the growing impacts of AI in precision agriculture, manufacturing, medicine and astronomy has been to remove limits of what we can “see”, treating the electromagnetic spectrum as just one more data source, for example, so that neural models linked to sensors can detect plant disease weeks before the naked eye.

The links between limits and new pattern power mark the eras of technology innovation that get labels like the X Economy, Digital Transformation, or the Xth Wave/Fourth Industrial Revolution. Without cheap leased line digital communications and self-standing terminals, the ATM was a fantasy. Breaking these limits turned them into an opportunity. The development of the Web broke open limits of the two-decade Internet by making it simple to publish online catalogs. The smart phone removed limits of time and location on services and communication.

4. ***AI is fundamentally centered on creating Pattern Power through breaking limits*** of biology, cognitive capacity, cultural legacies and other resources that have shaped human Intelligence. Our work is built on that perspective. We stress the word “perspective”: a way of looking at and sorting out the implications of AI. It’s not a theory, nor a model or methodology, but a viewpoint that seems to be useful for managers to consider adopting in two ways. It pulls together the many strands of AI theory and practice simply but not simplistically. It also makes it easier to assess the relevance of some new tool set to target AI to respond to Pattern Power high payoff opportunities – supply chain, customer personalization, research, etc.

This way of looking at AI also de-hypes much of the industry’s wilder claim to some new Revolution, by bringing to the forefront both the limits that it breaks and the ones that remain and wait for the next breaker. A practical example here is that many financial service firms are publicizing their use of chatbots as a transformation in personalizing the customer interaction and saving a lot of money on staff. They are exploiting the AI opportunities of natural language processing that took fifty years of sustained largescale research to reach.

Many are now realizing that they have ignored the limits of natural language understanding that constrains them to trivial conversations and limited real interaction. Removing these limits is a major area for advanced research in linguistics, mathematical modeling and neurobiology. Companies can take full account of limits and limit breaking probabilities and possibilities in the design of their technology infrastructures. It’s all a matter of perspective.

There is a clear need for such a management perspective on AI. It's captured by three figures that appear in survey after survey over the past five years and seem unlikely to change as much or as fast as the AI tool kits of the coming five years will surely move forward:

70% of executives see AI as Transformative

20% feel comfortable they know what AI actually is

20-25% of firms have an AI enterprise plan and Transformative portfolio of initiatives under way.

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We use our Limit-Pattern perspective to offer a way for managers to reduce this contradiction between Transformation in belief and incrementalism in action. Our focus is on answering three questions that are a mix of business universality and industry or business model individuality:

Is AI Transformational for us and if so in what ways?

How do we best respond in terms of Ambition: a commitment to either a (1) Break Away strategy that pushes the limits and aims at creating a pace-setter edge, (2) a Morphing of the business through sustained waves of change that may not be predictable but demand both a strong organizational and technical infrastructure and opportunism and flexibility, or (3) a disciplined and lower risk use of proven AI to Augment business operations, with a high rate of return and productivity value.

How do we ensure we have the resources we need to meet our Ambition? No firm has all the talents it needs in technical areas. Few have ones with business experience of AI. Collaborations, contracting, resource-sharing, vendor relationships, partnering and joint ventures are part of the adage of change: "Ally or Die."