

CHAPTER 6

LOOKING TO THE FUTURE

Despite the tremendous problems we face, our world of expanding complexity is not a sign that we are collapsing, but is really an indication that we are growing.

— Frank Spencer, Kedge/The Futures School [185]

There's a great big, beautiful tomorrow, shining at the end of every day. There's a great big beautiful tomorrow. And tomorrow's just a dream away.

— Walt Disney, *Carousel of Progress* [186]

To improve is to change; so to be perfect is to have changed often.

— Winston Churchill [187]

Many of the great advancements of the industrial revolution can be traced back to *quality* – total quality management (TQM), business process management (BPM), and a cluster of related disciplines can be viewed as core to major advancements in the twenty-first century, with their early and/or late adoption driving events no less than the fate of the United States vs Japanese automobile markets, and much more [188]. Core to these developments were structured methods to understand processes and flow of goods and human resources.

As we move forward into the knowledge-based economy of the twenty-first century, the next frontier of mapping and structured understanding is the *Decision*: an event – whether performed by man or machine – that characterizes the thought process around how actions lead to outcomes. Improving those decisions, through better alignment, collaboration, and continuous improvement, will define the success of this next phase in human existence.

This chapter looks forward into the future of Decision Intelligence (DI), to give you a flavor of some of the new initiatives that are growing from this foundational new discipline.

NEW IDEAS, NEW DI EVANGELISTS

The endeavor described in this book is ambitious: creating as it does a new context for technology, science, and everyday people to contribute to important solutions. It is also a very young field. Like a boisterous toddler, is new enough that those of us evangelizing the field (and that includes you, if you've read this far) still have an opportunity for great influence; yet it is mature enough we can be sure it's real, and a lot of fun, if a bit chaotic and unformed.

As I write these words in California, I have just now finished an interview with yet another new DI practitioner acquaintance. His company was started a few years back based on some of mine and Mark Zangari's early writings. And yesterday I met another employee of a major platform company, who tells me he's evangelizing DI company-wide. Yesterday I also heard about a new entity called the Global Challenges Collaboration (GCC) [189], with substantial overlap to the ideas here.

As these relationships build every day, it becomes increasingly obvious how unbounded the field of DI is, which explains its historical separation into multiple disciplines. But allowing the entropy to persist leaves a huge opportunity on the table: it is up to you and me to develop a framework for reunifying these disciplines to solve the hardest problems.

So where will DI go next? Will it, as discussed in Chapter 3, end up reconstituting Cybernetics? Is it realistic to create such a large and interdisciplinary field? When I started this work, these were serious questions for me. But over the years, and while writing this book, I have come to believe that the story introduced here is an inevitable and important development in the twenty-first century.

THE HEADWIND OF DISRUPTION

DI is emerging through a paradigm shift. It is facing a headwind, within a millennial-length trend of how people see themselves in relation to nature.

Only in recent times have we moved beyond a view of humans on a pedestal somehow able to manifest “pure thought,” qualitatively different from the world in which we live. With the advent of behavioral economics, the movement from symbolic to sub-symbolic AI and statistics – the science of uncertainty – we realize that we are as imperfect as the rest of the things.

The next step, says Google Cloud’s Chief Decision Scientist Cassie Kozyrkov [15], is

to build man back up, to accept that we are imperfect, and to build tools that make us better. Those mathematical tools come from data science, and their effectiveness depends on us designing them in light of our animal nature, not in ignorance of it.

So far, these tools have not been on this philosophical ride. Kozyrkov points to cross-field disdain as a barrier to interdisciplinary work.

Key Insight #55: Working upstream against specialization requires a shift in the often tacit understanding that to be smarter we must become more specialized: a position that upon examination is obviously flawed, yet represents a deeply entrenched belief system, at least as far as academia and research is concerned. Another benefit of re-integration of knowledge is the increased benefit of understanding (as opposed to being frustrated and paralyzed by) the results of the rapidly increasing complexity.

Yet the nature of the problems we face demands such an interdisciplinary, interdependent understanding: a view with a deep trunk and root, going back at least half a century.

Kozyrkov says that there may be “diminishing returns to improving life through amassing more and more of the same type of knowledge; eventually real breakthroughs might require us to think outside boxes and between them, radically synthesizing knowledge by exploring bridges between isolated academic disciplines.”

Key Insight #56: Indeed, we have enough *answers* today in many realms, yet not enough knowledge of the results of *actions* based on those answers. We have lost the ability to stitch the answers together to see how an action taken today leads to an outcome tomorrow.

This is the next most important revolution — neither purely scientific nor technological; it is a hybrid that allows us to use the answers in the most valuable way for the benefit of humanity.

DI is also arguably an important element of World Economic Forum Klaus Schwab’s Fourth Industrial Revolution, in which exponential technologies like the Internet of Things, AI, quantum computing, and nanotechnology are changing business models and impacting policy worldwide [190].

DI is galloping forward in a hundred directions at once. This chapter describes a few new DI-related initiatives that have crossed my radar. I briefly describe the emerging DI ecosystem of companies and other organizations, new DI-related narratives in fiction, and DI-related work in disability support and a shift to democracy as we know it.

THE DI ECOSYSTEM TODAY AND TOMORROW

In my work with technologists, politicians, economists, and more, I observe that tech is most ready for radical system change. The popularity of blockchain, for instance, represents this community’s recognition of the need for a massive shift in how we think about wealth. Education, in contrast, they want to ‘fix education’ instead of realizing that the paradigm is broken. Tech is limited in its perspective though, so its disruptive intentions need to be informed by connections to these other fields.

— Nora Bateson [65]

This book has, by necessity, explored only a part of DI, and has a technology bias. This is only an artifact of my own experience, and should not be taken as reflecting the focus — descriptive or prescriptive — of the field going forward.

Not only is my own lens technology-focused, but so is only a corner of the wider ecosystem that I know about. Companies that have indicated to me at one time or another that they are in the DI ecosystem include FICO, DNV-GL, Quantellia, Satavia, Prowler.io, DecisionCloud, PowerNoodle, Sympatico, eHealthAnalytics, gongos, busigence, EvenClever, PureTech, SAP, OpsPro, infoharvest, and absolutdata.

Consulting company Kedge/The Futures School’s approach to “Wicked Opportunities” is a particularly strong articulation of this ecosystem’s vision:

Several years ago we trademarked “Wicked Opportunities,” a concept that we have been working with for quite some time. This phrase is the opposite of Wicked Problems, the idea that most problems that we deal with today are so complex that when we attempt to solve them, we create three or more new problems.

Our old way of thinking, cemented in Industrial Age practices such as siloing, short-term ROI and the efficiency movement effectively vilified complexity as the enemy of humanity. In reality, complexity is the natural order of growth and maturity in evolutionary systems. It isn’t complexity that’s the enemy – it’s our outdated mindsets and processes.

Yes, Wicked Problems are certainly complex, multiplying and often dangerous. But what if we are exacerbating them, amplifying them – even creating them – through siloed fields and knowledge?

What if we are missing the opportunities offered through convergence, meshing and the maturing landscape of complex adaptive systems? What if our wicked problems are actually hidden wicked (complex) opportunities? [1]

If the above companies might be considered “core” DI firms, there is a much larger ecosystem of surrounding companies that offer decision support, systems modeling, and business intelligence software and/or services, all of which make valuable contributions to this ecosystem.

One example is the Long Now Foundation based in San Francisco. From its mission statement, the Foundation “[...] hopes to provide a counterpoint to today’s accelerating culture and help make long-term thinking more common. We hope to foster responsibility in the framework of the next 10,000 years” [191]. With a board that includes tech visionaries like Danny Hillis (of Connection Machine fame), Global Business School network founder Steward Brand, and *Wired* magazine cofounder Kevin Kelly, the Foundation’s mission reflects a growing movement amongst senior Silicon Valley technologists to move to a “next level.”

Another example is Nicole Helmer who runs a decision intelligence team within enterprise technology vendor SAP. Her group’s charter is to help startup companies as well as “intrapreneurial” groups within SAP to make evidence-based decisions to pivot repeatedly toward success. Although the

data sets used by her organizations contain only thousands of rows, and so might be considered “small” instead of “big data,” the decisions that they support have considerable value. For this reason, human expertise must work hand-in-hand with data, bridging the qualitative to the quantitative, combining the best of both worlds: intuition from founders and empirical evidence from the search for product/market fit.

For Helmer, the use of the name “decision intelligence” helps to place an emphasis on her team’s desired outcome — to make a good decision — as opposed to a particular method. Helmer says,

Decision intelligence says I can use the simplest method available to make the best possible decision. That could mean using a spreadsheet, machine learning, or some other method. By focusing on the decision instead of the particular technology, I have maximum latitude to pick the right tool for each task.

Helmer goes on to say that the focus on the decision helps her communicate effectively with stakeholders:

If I am talking with a new internal or external client, it’s hard for me to explain the kinds of problems that data scientists can solve. Letting them know that we are using data to make a decision to start with, rather than AI or ML, helps me to communicate effectively based on what people already know. [192]

EMERGING DATA SCIENTIST SPECIALIST ROLES

As shown in [Figure 67](#), data science (including ML and AI) is transitioning into widespread commercial usage in a pattern that is reminiscent of the path followed by computer science in the past.

Helmer’s work with many startup organizations has also given her a unique perspective on emerging roles as ML/AI/data science makes this transition. “Data science,” says Helmer, “is in a position that computer science used to hold. These days we call ourselves front-end coders, full-stack coders, and more, but not ‘computer scientists’. The fields have specialized, and that’s happening within the data science world too. We are starting to see job postings for ‘machine learning engineer’, ‘decision intelligence analyst’, and ‘data science engineer’ which is reflecting this specialization.

Figure 67. Data Science Is Transitioning into a Commercialization Phase, Much as Computer Science Transitioned in the Past. This Is Driving a Need for New Specialized Roles.

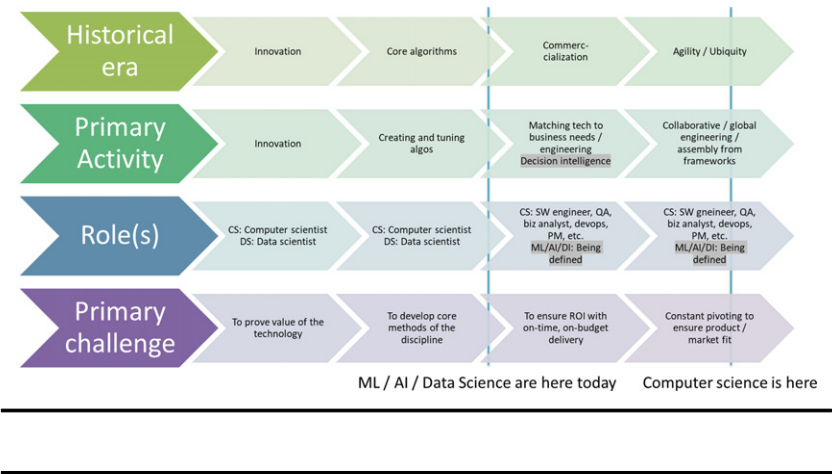
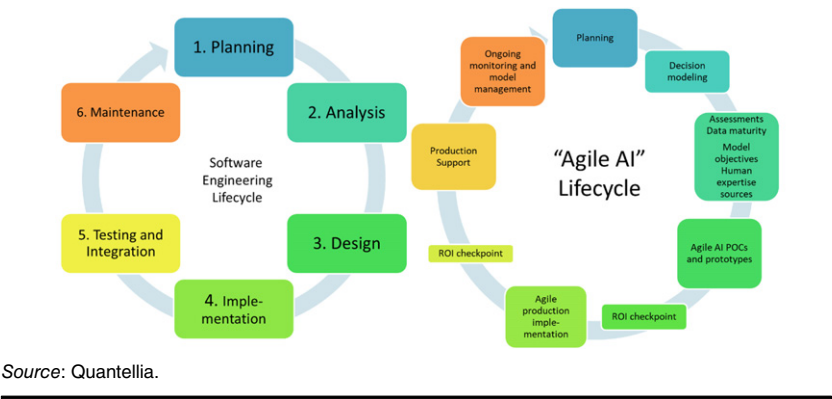


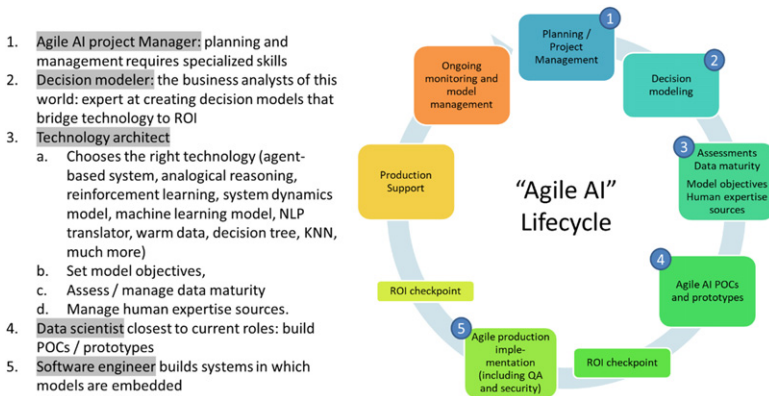
Figure 68. The Emerging “Agile AI” Lifecycle, Compared to the Well-established Software Engineering Lifecycle.



The skills within these emerging subfields are very different: one person might know how to set up ETL [extract/transform/load of data streams], and another may have never even heard of it.”

One way to express these roles is to relate them to a “software engineering lifecycle” diagram that has been around for many years, and is shown on the left-hand side of Figure 68. Quantellia’s related “Agile AI lifecycle” is shown on the right.

Figure 69. New Specialist Roles Driven by AI/ML/DI as It Transitions into More Widespread Use.



Source: Quantellia.

Associated with some of the steps on the right-hand side of Figure 68 are new emerging roles, shown in Figure 69. Not all projects will require all of these roles, but they do illustrate some of the specialties that are emerging as AI/ML transitions into commercialization, and which will make up an important part of the DI ecosystem.

DI AND THE NEW MYTHOS

In the beginning the power of words must have seemed magical [...]

— Alan Watts, *The Wisdom of Insecurity* [24]

When great shifts like the DI re-synthesis happen, they are reflected in and catalyzed by the stories we tell ourselves.

Until now, most great stories — from Homer to Disney’s *Mulan* — are about the “hero’s journey”: we celebrate an individual protagonist who explores a new world, encounters obstacles, and returns triumphant.

This narrative is increasingly falling short. We need, instead, stories that tell of unintended consequences, complex systems, collaboration, and actions that lead to a chain of events in space and in time — effectively we need a new set of archetypes which science fiction author (and former motion picture executive and Disney employee) PJ Manney calls “the new Mythos.”

Her novels are, in part, about the unintended consequences of technology, which are systematically overlooked.

Manney explains:

scientists don't benefit from talking much about possible unintended consequences of their work, which seeds doubt amongst funding agencies. But technology does create negative as well as positive effects, and it is critical that we embrace the effort to understand them. We must look at technology through an empathetic lens. It is one thing to build things in isolation; it is quite another to imagine being in the shoes of users and understanding the chains of events that technology sets in motion.

I visited Disney World recently, where I was struck by Walt Disney's future-focused thinking: his EPCOT vision ("Experimental Prototype City of Tomorrow") was, sadly, never realized, but was intended to be never finished. EPCOT was a continuation of Disney's path from short cartoons, through features, then theme parks, to the next level of intended impact on urban planning and, ultimately, society as a whole. The common theme in Disney's history is narrative, along with increasing immersion in it. And his goal was to catalyze the widespread shifts needed to take us to a new place. And the Disney corporation's choice of a Buckminster-Fuller-inspired Spaceship Earth at the opening to EPCOT indicates a continuation of the themes of this book.

Manney explains another emerging story theme that goes, "when we use logic, we make bad decisions." The Terminator backstory was influenced by the movie *Colossus: the Forbin Project*, where an evil Artificial General Intelligence (AGI) concludes that humans are stupid, runs logic to its conclusion, and creates havoc. AGIs in movies like this one, says Manney, are allegories for human fears of "organizational robots," specifically our loss of control over governments and military organizations. These stories reflect a sense of futility; we can't possibly understand nor control increasing societal complexity. But there is another narrative: that this is only a transient state, as we develop new tools like DI to help.

"If we are to survive," says Manney, "we must be able to start employing larger contexts and to understand how we fit into them [...] this is not about having to give away your things [...] it is not collectivism. It is simply being more thoughtful, and writing about the group dynamics of worlds, and to understand a greater number of moving parts" [193].

THE HUMAN ELEMENT

There is always a lot of input and output. The input and the output happen in every second, and we should learn how to look at life as streams of being, and not as separate entities. This is a very profound teaching of the Buddha.

– Thich Nhat Hanh [194]

Increasingly human perception, response and behavior is becoming digitized. The ultimate promise of AI/ML is to utilize this data to help us become our better selves, the ultimate betrayal is to exploit our psychology.

– Charles Davis, CTO/Cofounder ElementData [124]

Progress in new endeavors like DI must be accompanied by new insights within individuals. Kathia Castro Laszlo writes:

we will not be living better lives if we do not transform ourselves, our lifestyles, choices and priorities [...] Systems being involves embodying a new consciousness, an expanded sense of self, a recognition that we cannot survive alone, that a future that works for humanity needs also to work for other species and the planet. [...] This is the wisdom of many indigenous cultures [...] part of the heritage that we have forgotten, and we are in the process of recovering [...] Systems being and systems living brings it all together: linking head, heart and hands [195].

Indeed, many spiritual traditions embody the following insight.

Key Insight #57: The greatest wisdom about the future begins by entering the present moment.

AI, DI, AND THE LAW

Legal and policy decisions are some of the most impactful on societies worldwide. The legal profession is changing substantially in response to AI, in particular natural language processing (NLP), which supports analysis and creation of legal documents such as contracts, thereby automating many tasks in the legal profession. James A. Sherer, a partner in the New York office of BakerHostetler LLP, says: “[...] AI is [...] impacting current

attorney practice in four discrete areas: (1) document review in e-discovery (“predictive coding” or technology-assisted review), (2) contract due diligence review in corporate transactions, (3) third-party legal research products in multiple practice areas, and (4) time entry and matter analysis” [8].

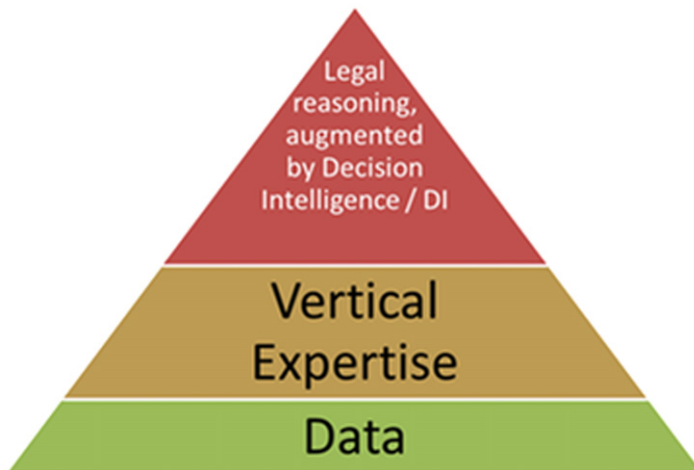
Another perspective comes from Michele Colucci, a Silicon-valley based legal technology entrepreneur and CEO of Justiquity.com. Figure 70 shows Colucci’s view of how AI and related technology is changing the legal profession.

Colucci says that data and data analysis support the higher-value levels in this “AI in Law” pyramid. Data can be used to support vertical expertise, which can help a defendant, plaintiff, or lawyer to be more effective. Examples are analyzing past cases to determine the best strategy for a case, such as the most favorable jurisdiction, attorney, court, or judge.

Complex legal reasoning, says Colucci, will always be the purview of humans, with their detailed knowledge of the world that is unlikely to be replicated by computers anytime in the near future. “Good lawyering,” says Colucci, “will always be the secret sauce separating us from the machines.”

So how can technology help? DI combines models based on historical information as captured in data and analyzed by AI with models of the world provided by humans.

Figure 70. How DI Enhances Legal Reasoning.



KNOWLEDGE GARDENS

Jack Park's Topic Quests Knowledge Gardens initiative [196] is driving innovations in visual and interactive representations of online collaboration to support "wicked conversations".

Park says that part of the reason for the effectiveness of game-based conversations is that because people work through avatars, the ego is suppressed, leading to more effective problem-solving. Says Park, "When a human is controlling an avatar, some very important psychological benefits are in play ... they are less likely to inject their personal identities, their personalities, and their biases into the game." This facilitates "[...] the transition from me to we [...] the entire process shifts from egocentric to ecocentric." Park's work also involves creating visual representations of knowledge structures.

GANDHISM, TRUSTEESHIP, AND COMBATING WEALTH INEQUALITY THROUGH DI

Gandhi predicted that both capitalism and communism would eventually fail [197]. He proposed a third system, called *trusteeship* [198] which held tremendous promise. Yet today's world is much more complex than the one that Gandhi inhabited, and so we need new technologies to navigate the maze of the complex adaptive system that characterizes our cultural, economic, and political reality.

Ferose and Pratt [199] describes a vision for this social and economic shift, and includes a description of how DI can help this initiative to manage the complexities of incorporating checks and balances into such a system. The article argues that

Data, AI, and DI are powerful weapons against such exploitation because they allow us to, respectively, 1) obtain direct and voluminous empirical evidence regarding human behavior; 2) analyze the data to understand and predict the outcomes of certain events; and 3) choose actions to initiate chains of events that simultaneously achieve desirable individual, organizational, and societal outcomes.

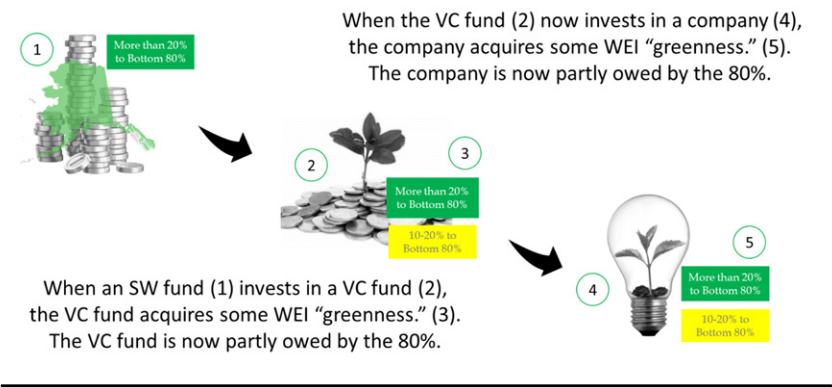
A related new initiative by Kamesh Raghavendra and VR Ferose is developing a wealth equity index (WEI) to address widespread global wealth inequality using market forces. Similar to “green” measures of companies, this index uses market forces to grow companies whose activities decrease wealth inequality worldwide. This happens through a multi-step chain of events. For this reason, the success of this initiative depends on an understanding of multi-link economic flows. These must be understood not just by economists but by the population at large.

One potential mechanism is shown in [Figure 71](#). It shows how sovereign wealth funds (like Alaska’s initiative that sends a check to all state residents every year) invests in a VC fund, which in turn invests in companies. Those companies receive a “red,” “green,” or “yellow” WEI label, indicating the degree to which their success benefits the bottom 80%.

Consumers looking to reduce wealth inequality then will preferentially choose to buy products from “yellow” or “green” WEI firms, thus driving value for all members of value chain, and ultimately benefiting the lower 80% of the wealth holders in the economy.

As of this writing, the WEI initiative has not yet been announced, and the particulars of the model may change, but the need for a good understanding of how multi-link effects play out over time is essential to its success.

Figure 71. One Mechanism by Which the Wealth Equality Index Can Redistribute Wealth to the Bottom 80%.



Ferose, who heads SAP's Engineering Academy, says:

Drastic changes are needed to reverse trends towards inequality worldwide, and the WEI index is one mechanism that can make a big difference. To successfully, transparently, and collaboratively model and manage the effectiveness of any initiative this complex will depend on both good AI/data science models, as well as presentation within a cause-and-effect model flow. Trust in these models will be essential, so we need methods that are both understandable and sophisticated, which is true for DI models. [200]