Transforming your company's performance with analytics + design

24 October 2017

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Many corporate leaders have embraced and applied design thinking to new-product development. But few have recognised this potentially more valuable alliance: design thinking and data analytics. In the same way that analytics should flow throughout an entire organisation, so should design. A five-part framework can help organisations to fuse analytics and design, inject a much-needed human element to data-driven decision making, and ensure real and lasting transformation.

By now, most business leaders understand the potentially enormous benefits of embracing the data analytics revolution.[1] But few have realised such gains. This is largely because analytics-enabled transformations require not only new technology and killer algorithms but also a magnitude of cultural change. This change requires a deep understanding of humans as well as machines and data. Without this understanding, it's impossible for analysts to be clear on the purpose and goals of the project, explore new and different ways to define use cases, and be empathetic toward customers and employees—all prerequisites for success. Moreover, this understanding is necessary for data scientists to communicate the output of statistical models as compelling stories for executive decision makers.

In parallel to advanced analytics taking hold, a design thinking revolution has captured the attention of the corporate world. Pioneered in the 1990s, design thinking provides business leaders with a more creative approach to problem solving. And it brings a decidedly human element to decision-making processes: empathy. Designers don't just take the work of others and make it pretty. They bring an understanding of people and their wants and needs to the center of any process. Designers are experts at taking extraordinarily complex problems and more sharply defining them. They can gather intelligence and use it to shine light into dark corners, innovate, and create lasting impact.

In the past few years, many professional services firms and large tech companies have acquired design companies or staffed design departments of their own. This turn toward design drives home the idea that business leaders can learn a lot from the way in which designers solve problems and empathise with real people. But the evidence both suggests that big corporations still have much to learn about how to embed design into their processes and that past successes have mostly been in new product and service development.

In short, many business leaders still think of designers as the team that comes in to help visualise conclusions once they're drawn or to give form to a product vision once it has been defined. But, as the whole design thinking movement has demonstrated, design can't be viewed as supplemental to an engagement; design is the protocol. In our experience working in advanced analytics, the combination of designers and data scientists creates an 'augmented intelligence' that packs a tremendous punch in helping companies be the best they can be. But to transform how a company operates and performs at an elite level, cultural change is required.

The next step in both the analytics and design revolutions requires that business leaders recognise how design can help contribute to the success of more analytically driven endeavors and work to infuse analytics + design into the cultures of their organisations. To help business leaders achieve this goal, we've developed a five-phased approach, the 5i model, which brings cutting-edge analytics and design thinking to the fore, making design an integral part of problem-solving processes from the outset. The model seamlessly brings together analytics and design, injecting that much-needed human element and ensuring real and lasting transformation.

> Once the integration of design is achieved, analytics efforts are much more likely to reach the ultimate goal of translating data-driven insights into human value.

1 For more, see http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/straight-talk-about-big-data

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Human + machine > machine. Every time.

Much has been written about Deep Blue, IBM's successful effort to defeat the world's best chess player in 1997. Chess masters' reaction to that defeat, however, was less widely publicised. Rather than giving up, they re-evaluated their strategies and devised what they call 'Advanced Chess', where a human player uses a computer chess program to explore their options before deciding on the best move. The result, as one technology writer put it, was 'revelatory' [2]. Advanced Chess has shown that even weak computers assisting skilled humans will trounce the most advanced supercomputers. In the same way, through augmented intelligence, a designer given the output of a machine-learning algorithm can inject a human element into decision making and add an immense amount of value for business leaders.

To realise that value, when rolling out design-led analytics transformation programs, organisations must invariably be:

- Iterative in their approach to generating hypotheses to test with data and exploring use-cases.
- Empathetic in their approach to analytics-enabled transformation; understanding employees and customers from an ethnographic perspective as well as in terms of hard data. This means that they account for qualitative, as well as quantitative inputs.
- Compelling in the way that they tell stories with data, therefore providing actionable advice and driving the adoption of those insights within their organisations.
- Driving a culture of continuous transformation; repeating the cycle of data-driven performance uplift across every facet of their business by combining the best of advanced analytics and design.

Of course, many challenges block the path toward this utopian state where the cultures of design and analytics are fully intertwined. Impediments include a shortage of talent in data visualisation and service design as well as entrenched ways of thinking that adhere to traditional problem-solving approaches.

Design is much more than a support function

When done right, design can be the method by which the business defines the problem they wish to solve with data at the outset. Designers can empathise with employees and customers from an ethnographic perspective and help tell compelling stories with data so that insights are ultimately acted on. This whole approach leads to much tighter loops of feedback, so business leaders can make decisions more quickly. And because design is no longer just about craft and aesthetics, it becomes infused throughout the organisation and embedded in all processes.

Once this integration is achieved, analytics efforts are much more likely to reach the ultimate goal of translating data-driven insights into human value. Designers can absorb complexity and transmit clarity—whether that's ensuring that the C-suite are solving the right problems with data in the first place, fully understanding the wants and needs of employees and customers, creating beautiful and compelling visualisations in collaboration with data scientists, or designing digital tools as part of a transformation program.

Professional services firms, for example, when working with client organisations on strategic, organisational, or process improvements, now often place a designer on their teams at the outset of projects as well as encouraging all team members to 'think' like designers. Adopting this perspective means not settling on solutions too early on in the process, not making assumptions about the wants and needs of customers and employees, and communicating ideas and insights with a level of sophistication and visual clarity.

At a time when the gains achieved from product innovation are diminishing, combining cutting-edge analytics and design thinking can turn performance improvement on its head. Rather than purely looking at the front end of the market, companies should be looking internally at every single business unit to see where they can achieve gains on the competition.

Being data driven isn't about handing over control of decision-making to the machine. It is about taking the machines' output, gleaning insight, and figuring out how to apply it across all business functions to uplift the entire organisation's performance. The 5i model walks organisations through each step necessary in making design thinking an integral part of the analytics problem-solving process from the outset.

2 James Bridle, "What's wrong with big data?" New Humanist, Autumn 2016 edition. https://newhumanist.org.uk/articles/5104/whats-wrong-with-big-data

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The 5i model: Boosting corporate performance through analytics + design

Even within organisations that understand the value of injecting a human element into data-driven decisions, the old way of working often persists. Designers are relegated to a supporting role, called in at the end of a project to make the work of others look beautiful. An engagement that fuses data engineering, data science, and design from the start, however, can yield far better results (Exhibit A). This engagement typically consists of a product owner, an analytics-engagement manager, a data engineer, a machine-learning engineer, a data scientist, and a designer. In a highly collaborative way, they embark on their journey through each phase of the 5i model.

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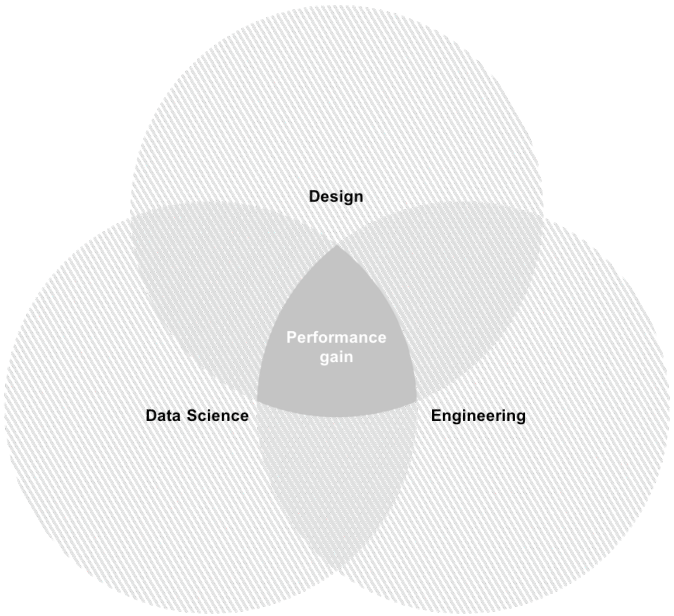
Phase 1: Ideation

This first phase is purely exploratory. The team focuses on defining the problem, generating ideas, and using the design process to identify the opportunity for performance improvement across an organisation's entire value chain. During ideation, the team will ensure that everyone is clear on the purpose and scope of the data analytics project, identify and size the opportunity to improve performance, and imagine an ideal future state. By allowing a user experience or service designer to lead ideation and scoping workshops, organisations can define a clear vision and tangible goal from the outset of the engagement.

Design may be used at this stage to help re-frame the problem to be solved with analytics, gaining a deeper understanding of the human elements of a system and where potential gains in performance can be exploited with data. The goal is to apply design thinking techniques to crafting a meaningful vision statement for an analytics-enabled transformation, whether it be for a manufacturing process, a communications network, or a clinical trial. By exploring the opportunity with stakeholders and gaining an understanding of their needs and wants, we can ensure at the outset that we are applying analytics to the right business areas.

Exhibit A
Fusing Design, Data Science and Engineering to drive performance gain.



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Phase 2: Intelligence

This second phase encompasses hypothesis-gathering workshops and data landscape mapping. Rather than starting with a narrow set of hypotheses or a single solution, we conduct 'How might we?' or 'affinity mapping' workshops to encourage divergent thinking. The goal is to arrive at a diverse set of use-cases and a related set of data sources, ensuring that all stakeholders are contributing hypotheses that they wish to explore.

At this stage a designer can also work closely with organisations to help them visualise the desired end state of an analytics study. They may sketch a desired process flow, a tangible digital intervention, or a user journey, as we did for a global pharma company, for example.

Drugs sometimes perform very differently in the real world, where people often have multiple chronic medical conditions, take other medications, and don't take the drugs at the prescribed times or doses. The company wanted to evaluate how one of their many drugs was performing outside of the controlled environment of a traditional drug trial. Executives wanted to know how well and how safely the drug performs in the real world, as well as how its performance compares with competitive products.

The designer on the engagement went into the company's offices on that first day with a creative technologist and an expert in data visualisation. Together they ran a workshop where all stakeholders were involved in sketching out and refining concepts for the project's potential end state (Exhibit B). They figured out straight away the critical importance of a patient's journey, both on an individual level as well as in an aggregated way that would allow them to identify trends. They conducted an experience-mapping session with the pharma company's team to nail down all the elements of a patient's timeline—such as dates of diagnosis and first treatment, if and when the patient switches between their drug and others, and how often and how severely they relapse.

Exhibit B
Encouraging the entire project team to sketch their ideas.

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The sheer number of data points along the journey made the task a formidable challenge. Despite that they had a ton of information to assemble in one space, they worked in an iterative way and came up with a tool that represented each patient as a line traveling through time. In the exhibit below, the line changes colour depending on what drug a patient is on, so the company could clearly see when patients were using its product (Exhibit C).

Over time, the team gathered more intelligence. At this stage of the process, the project team pulled in a user experience (UX) designer, who can often bring additional insights based on their own ethnographic research with company employees and customers. In turn, the designers enlisted medical experts to determine how to interpret the patient events, which helped them to simplify the patient journey. As the prototype of the tool developed, it became easier for the client to see, for example, when a patient had an adverse event or unpleasant side effect that caused them to switch drugs.

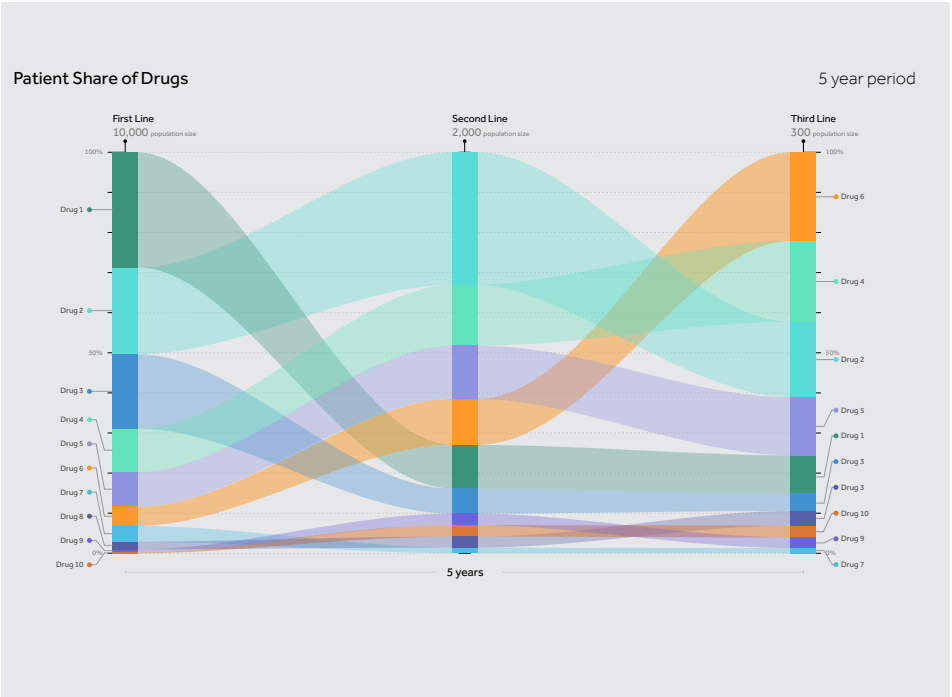
Design roles: user experience or service designer, data visualisation designer, creative technologist

Phase 3: Inception

Only after the intelligence phase can a team have a good handle on which hypotheses to test and use cases to focus on. A complex picture of an organisation's data landscape often emerges. At this early stage, a data visualisation expert can often provide a very powerful picture of multiple data sources and a 'single view' of a customer or product. For the global pharma company, the team used machine learning techniques to identify subsets of patients for whom their drug was more effective than others. Critically, this step helped the pharma company visualise the diversity of data sets rather than getting lost in the volume of data.

Similarly, the new CEO of a luxury car manufacturer wished to use the company's vast amounts of data to bring it into the digital age. He laid plans to introduce a new car model and refresh a number of existing models. But on each model, the teams of up to 100 designers and engineers weren't collaborating. As a result, lead times were slipping and deadlines regularly extended, which had a direct, negative impact on the bottom line: each additional week in the process cost the company £3 million, yet executives were at a loss for how to improve the process and monitor performance.

Exhibit C
Visualising the patient share of drugs over time.



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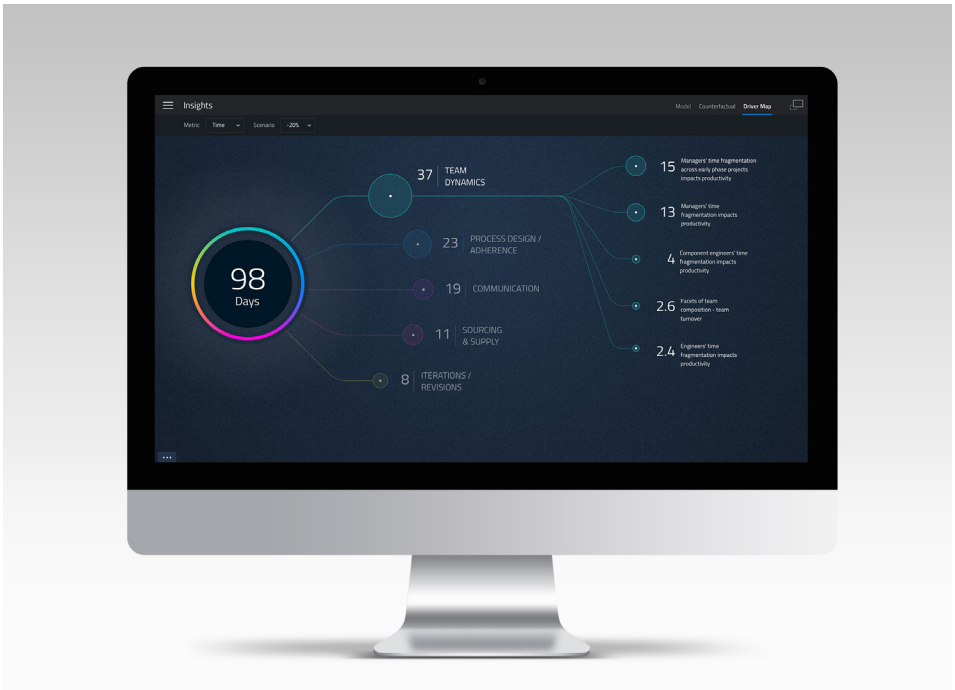
The CEO enlisted our help to overhaul its new-product development processes. First, we completed the intelligence phase, where we identified which of the hundreds, sometimes thousands, of critical points in the process might allow the company to improve efficiency. Then, our data visualisation designers and creative technologists worked closely with our data scientists and consultants to perform analyses to understand where the process was breaking down and to visualise those initial insights. We provided explanatory models that helped the company to better understand a process delay with respect to a project plan, for example.

Initially, we developed a single model for the entire process to quantify and help senior management visualise the overall delay (Exhibit D). However, we soon realised that there were different types of inefficiencies at different parts of the process, so we developed different models to quantify the effects more precisely. For instance, analysis of e-mails revealed that people who were working on similar components across groups weren't communicating or meeting with each other, a clear marker that design and engineering weren't collaborating how they should be.

Exhibit D
Visualising an explanatory model to understand performance drivers.



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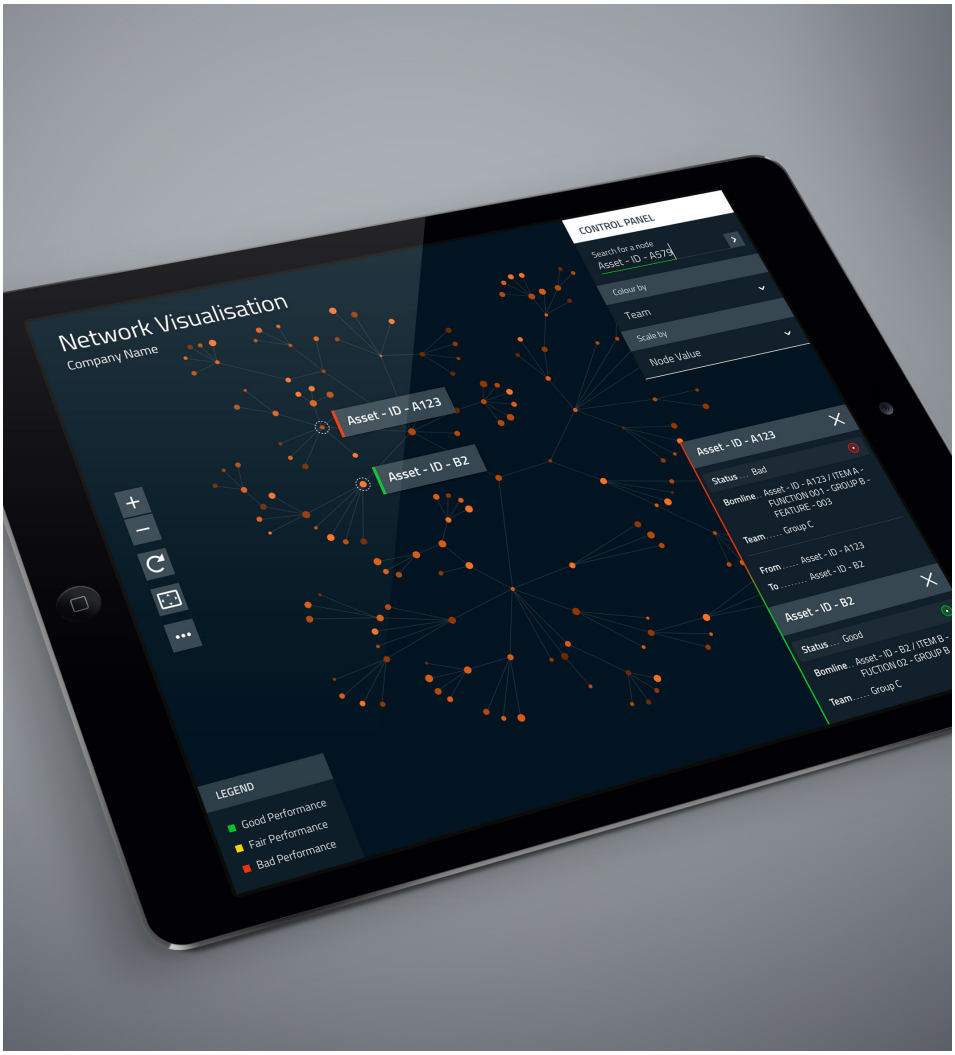
At this stage, the purpose of design is to tell stories with data, make data-driven insights about an organisation consumable and compelling, and facilitate adoption. So employing data visualisations was a key part of the process. These visualisations provided aggregate views of people and suppliers that were tied to each component to shed light on where the process was breaking down (Exhibit E). These data visualisations helped the company conceptualise just how data analysis can be harnessed to reshape and better their processes; it therefore helped them become more invested and active in the process.

Design roles: Data visualisation designer, creative technologist.

> In the same way that data analytics should flow throughout the entire organisation, so should design.

Exhibit E
Visualising a car project as a network.



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Phase 4: Intervention

Designing digital interventions as part of a transformation program mobilises a business to translate data-driven insights into real-life work-flows and processes, in the form of user-friendly interfaces and decision-support tools. Good designers will make sure that any tools and technology embedded in an organisation actually get adopted by users and ultimately improve performance. For the car manufacturer, for example, our data scientists constructed simulations that enabled executives to assess the impact of different actions and inputs on their process. They also developed easy-to-use predictive models to forecast process delays in advance. Designers then helped construct a tool that allowed users to play with scenarios and track the performance of their design and engineering process in real time, ensuring that performance gains would be captured (Exhibit F).

As a result of this engagement, the auto company shaved 100 days off its engineering-design interaction cycle. Moreover, it expects to get cars to market much faster, saving a considerable amount of money. The company is now looking to apply what it has learned to parts of the new-product development process not covered in the original analysis, which may lead to even greater savings. It recognised, for example, that it needed to change the structure of its teams and how they worked together. Rather than having the design department work in its own studio and engineering holing up somewhere else entirely, they now work together, physically, for at least part of the process.

The tools and capabilities the company gained through the project has given them a greater understanding of how to apply data-driven analysis to other functions as well.

Design roles: Data visualisation designer, user experience or service designer, user interface designer, creative technologist

Exhibit F
Tracking performance drivers in real-time.

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Phase 5: Independence

Following on its initial successful engagement, this auto manufacturer is poised to go through the whole process again with different business functions to foster a culture of continuous transformation. The end result should be an organisation with analytics, design thinking, and performance capture embedded in its company culture. In the same way that data analytics should flow throughout the entire organisation, so should design. This ensures that business leaders always have access to data, focus on the right use cases, are empathetic with employees and customers, and ultimately make decisions based on truly compelling visualisations and tools.

A business can perform at an elite level by working to infuse design into every single business unit and function, rather than just top-line product innovation. Analytics can help uncover the marginal gains to exploit and, in collaboration with design, can encourage a business to look at how it performs in its entirety—from its sales team effectiveness to design and engineering processes, manufacturing, and new-product development.

Design belongs to everyone

Yes, tangible products and visualisations are fundamental to data-driven change programs. But design can and should be much more than these physical elements. Design is no longer just about craft and aesthetics, and it is not the sole domain of design school graduates. Everyone should be part of the design process. By adopting the idea that design is a mind-set and not just a means to an end of creating 'beautiful objects', we can encourage more collaborations with analytically minded people that uncover truly compelling, data-driven insights.

The design believers have to help bring their colleagues and clients along the journey to infuse design into the very fabric of their organisations. This undertaking will bolster a fresh approach to the traditional techniques of solving thorny business problems and perhaps shape a future where every analytics project has a designer working alongside a data scientist—together driving real transformation.

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Thank you

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