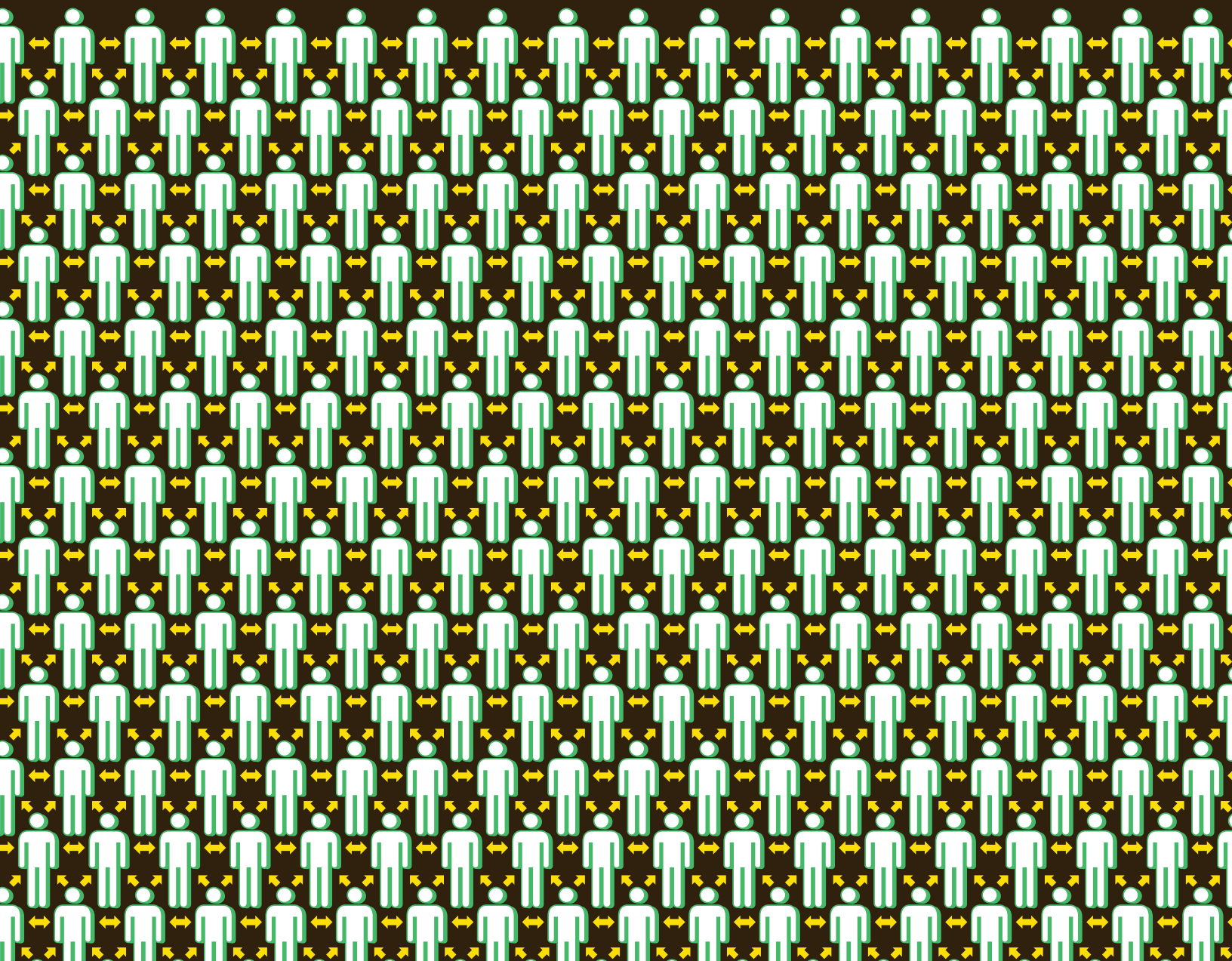by **Fred Dust** and **Ilya Prokopoff**

Designing Systems
at Scale

When attempting to solve wicked problems, creative thinkers must design systems that influence people's behaviour on a mass scale.

WANDER INTO MISSION PIE, a corner café in San Francisco best known for its namesake baked goods, and the place looks familiar enough. The 10 or so wooden tables, all in close proximity, are filled with pie-eating, warm-beverage-sipping customers. Some people chat, while others read leftover newspapers or peck out e-mail messages from their laptops. Swap the pie for bagels, and you could be in another San Francisco café. But stick around awhile, and the peculiarities of Mission Pie become apparent.

First off, roughly half of Mission Pie's 14-person staff is young – *really* young. But they're not the usual grad-school Lit majors or aspiring musicians working in so many of the city's eateries. They're either current or former students from Mission High, a nearby public high school with 68 per cent of the kids eligible to receive free and reduced-cost lunches. San Francisco native **Karen Heisler**, Mission Pie's owner, is largely paying the kids to understand where their food comes from and its impact on their bodies, their neighborhood and the world at large.

There's a surprisingly complex system behind a slice of Mission Pie's plum frangipane or mixed-berry tart. Mission Pie is part of a larger system: **Pie Ranch** is a 27-acre parcel about 90 minutes from the café and well positioned above the historic Steele Ranch. Named for its shape when viewed from atop a nearby ridge, it operates as an educational non-profit with the goal of inspiring urban youth to transform their relationships to food, and to work with their communities in building healthier local food systems. Not only does Pie Ranch supply the café with berries, pumpkins and apples, it welcomes the café's Mission High staff to work the land, contemplate the crops and sample the fresh food.

As both Mission Pie and Pie Ranch have found, the simple task of showing people where their food comes from and pointing to the impact of industrialized farming touches off all sorts of big system challenges, from obesity and education to sustainability and personal food-related attitudes and behaviours.

To design compelling, effective solutions for challenges of all sizes, an organization must consider the overarching system it hooks into. Heisler is a firm believer in the necessity of the human element – the community as a manifestation of the system. "Lose the human aspect," she says, "and the system falls apart."

In our work, we see system disconnects around us all the time. As networks grow and mutate, designers are forced to tackle issues of scale, legacy and influence. This reminds us that life is complex, and as designers, business people and other creative thinkers, we must resist both the seduction of simplicity *and* the safety of Byzantine networks that allow good ideas to fade and humans to be lost or forgotten.

When tackling major challenges, we think about 'systems at scale', which involves two distinct elements: designing systems that work and influencing people's thinking at mass scale. The best design solutions do both.

Balancing the Ecosystem

Every ecosystem is comprised of both micro and macro elements, and when any element gets out of whack, the rest of the system suffers. In too many cases, products and services are conceived to impact massive change, yet the offerings lack an awareness of their overall systems.

Consider, for instance, the Segway. The two-wheeled transporter didn't catch on for a lot of reasons, from cost and practicality to a mountain-high learning curve for use. Still, an overarching issue was that it wasn't intentionally designed to be a part of a larger-scale system; rather, it was an individual product at odds with a larger ecosystem. The Segway clashed with local road and sidewalk regulations and has yet to be approved by the **Food and Drug Administration** as a medical device, which would allow for expanded use in public spaces. Worse still, it didn't perform on the human scale – when it functioned, the rider still looked and often felt silly. How might creative thinkers at Segway have considered the broader range of real-world

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design challenges that could make or break the relevance of their new technology?

On the other end of the spectrum, there are examples of efforts that influence people's thinking, but are not complemented by the systems needed to make them succeed at a large scale. **Al Gore**'s *An Inconvenient Truth* is an interesting example. The documentary focused on educating people through a PowerPoint presentation about global warming. When Gore's road show took off in a way few expected – ultimately becoming the fourth-highest-grossing documentary film to date in the U.S. – the effort struggled to move from knowledge to action. The task at hand – lessening the impact of global warming – seemed, to many viewers, hopeless.

When the final credits rolled in Gore's slideshow, viewers were given a long list of small changes to make in their lives to offset global warming. For some, these suggestions felt too individually based and incremental, missing out on a proposal for a system-level solution as a complement. Gore and his team are now working to address the system at scale by bringing in more stakeholders from the governmental and business sectors.

Problem-solving for big systems often leads designers to ask tough questions: how can an organization turn its workers, partners and customers into believers, people who buy into the current system, yet continue to help grow it? How can an organization avoid making only incremental changes or giving in to the temptation of defining a problem as 'unsolvable' or 'inevitable'? How can we make changes that impact multiple organizations and ultimately solve really big problems? The following examples – hard-earned success stories – show the potential for what balanced ecosystems can achieve through human-centered design, sticky systems, and reciprocity.

Growing Influential Networks
Following are three approaches that specifically deal with the idea of humanizing big problems to influence people to change and grow influential networks.

1. Human-Centered Systems: Design for People, Not the System
The notion of designing human values into big systems isn't new.

How-to business books the world over talk about building and maintaining that human connection. But often, the advice seems hollow, like a poster in the employee break room reminding everyone to smile at the customer. The point isn't to simply humanize a system, but to embed *specific* human elements within it.

One of our favourite success stories comes from an unlikely place: Bogotá, Columbia, a place typically known for corruption, violence and general indifference to chaos. In 1995, after 18 years in academia, **Antanas Mockus** was elected mayor of Bogotá, a position he held intermittently between forays into presidential politics until 2004. While mayor and in his subsequent work, Mockus showed a knack for human-centered design by putting himself directly into the mix. For him, this entailed literally bumping shoulders with the city's inhabitants and personally reaching out to them.

When Bogotá's water was in short supply, Mockus had himself filmed showering for local TV broadcasts, during which he turned off the water as he soaped. The goal? Get city dwellers to curtail their showers to less than 20 minutes. Show them, as Mockus explained, "that even in a very private space, your behaviour can be linked to a citizen's duty. You cooperate because of the fun of doing it." Within two months, people were using 14 per cent less water.

Humour as a human element can certainly be used as a generalized way of creating robust systems. But Mockus showed real genius in systems design when he incorporated more specific cultural insight into his approach to changing human behaviour. In 1998, he hired 420 mimes to help calm traffic by standing at major intersections and poking fun at scofflaw drivers. In doing so, Mockus used a deep insight in the Columbian nature: the citizens of Bogotá were far more uncomfortable with being mocked than they were with being fined. Faced with public humiliation, albeit humorous, they opted to change their behaviour. Within the year, traffic fatalities dropped from 1,300 to about 600 in the city. "Mimes defeated pessimism," explained Mockus, adding, "Feel confidence in unexpected solutions."

Mockus' antics are more than one-trick wonders. They reveal a deep understanding of his constituents and a confidence to use humour, reality, and cultural insight to aid in big system change

and more viral but profound behaviourial change. In short, he understands what it takes to design for impact at scale. Mockus shows the value of looking past what a system should simply accomplish to ask, What should the system *feel* like? In doing so, he brought the human into the mix in a way that had significant impact on the broader system.

Alas, Mockus' political career hasn't been a complete success: he has failed to win presidential campaigns twice, and it's fair to wonder how conscious he was of the system at the start of his city-turn-around campaign. Still, Mockus is clearly on to something, with his ability to build both a directed and an organic system and identify insights that can lead to behaviourial change. Enough so that the John F. Kennedy School of Government at Harvard brought him in as a visiting fellow at its Institute of Politics.

Professor **Jane Mansbidge** had him talk to her class "Democracy, from Theory to Practice." "He focused," she explained in the *Harvard University Gazette* in 2007, "on changing hearts and minds – not through preaching but through artistically-creative strategies that employed the power of individual and community disapproval." She added that Mockus "made it clear that the most effective campaigns combine material incentives with normative change and participatory stakeholding."

There is brilliance in this approach. As we design our way out of difficult problems, we need to harness influences that can become viral and, eventually, create ever-expanding loyalty and adherence that becomes organically self-sustaining and able to reach a broad range of stakeholders in a system. The citizens of Bogotá may have laughed when Mockus spoke while wearing yellow Spandex tights and a red cape, dressed as 'Supercitizen', but they listened. More importantly, many changed their behaviour.

2. Sticky Systems: Design for Scale

Solutions – not only people – can be trapped inside silos. Too often, solutions for big problems are subdivided into component parts: Let's make a system that solves this, or Let's get people to change their beliefs, so they do this. This approach rarely leads to robust solutions, and it can be counterintuitive, making people feel disempowered. When designing systems at scale, we must consider the whole ecosystem that needs to be engaged. With multiple networks within an ecosystem, shareholders need to understand – and buy into – the desired impact.

Functioning 'silos' can be effective at a particular task, but the overall system eventually threatens to bottom out or limp along (think back to Gore's *Inconvenient Truth*.) It is only by combining components into a whole that we see the potential for a solid, sustainable ecology – something we call 'sticky systems'.

The **American Red Cross** has long had an effective system for collecting donated blood, but it turned to IDEO when it recognized the need to improve its long-term influence with donors and become more proactive in attracting new and younger donors.

Many people outside the organization, Red Cross officials realized, didn't associate the organization with the donation process: rarely were donors seeking opportunities to give blood independently and directly to the Red Cross. Rather, they waited to be spurred into action by a local school or church blood drive. The individual donor experience became the chance to influence donors to give as though it were their jobs or personal passions. As IDEO worked with the Red Cross to gain greater emotional relevance with potential new donors, the question posed to donors shifted from "how much blood?" to "why I give." Everyone had a story to tell.

Putting human sensibilities at the center of the solution for scaling influence also allowed staff and volunteers to reconnect with their humanitarian mission, as opposed to becoming cogs in the system. Workers posted donor-generated "why I give" answers on walls and a Web site. Surprisingly, privacy wasn't an issue: donors wanted to share their stories broadly. The "Why I Give Campaign" became the centerpiece of a community-building experience that reminds donors that there's no need for a middle-man when giving blood. As one donor from North Carolina explained, "It's great to find out why someone donates. It gives you more of a reason to donate yourself."

3. Reciprocal Systems: Connect by Sharing

Convincing people to give back to a system as a means of connecting to it is, in some respects, a telltale sign of system success. It can also be incredibly difficult to do. Yet, when the other key elements such as human-centered design and influential systems are working, it becomes possible. **Wikipedia** and other open-source systems certainly make it look seamless.

Best Buy is another example. With a complex ecosystem of 140,000 employees, hundreds of retail stores, and a legacy of more than 40 years, the company leverages the power of its scale, but the focus is not on consistency or predictability (though it generally delivers on these points.) Rather, it's on building simple systems that engage people in focusing their creative energy on making things better for themselves and their customers. It's an acknowledgement that no one person at the top will have all the solutions, and that people on the frontline want to do their best and contribute to the continual improvement of the whole.

Another interesting element of Best Buy's system is that it's been designed deliberately to be 'fuzzy' at the edges, to allow and encourage room for people to generate and try new ideas and to give back when and how they can. The scale of the organization is harnessed by creating venues and processes by which employees can see themselves as part of a local team that has global reach.

Best Buy's women's leadership forum, known as 'WoLF', shows this in action. **Julie Gilbert**, a senior vice president at Best Buy, started WoLF in 2004 as an innovation engine and employee resource group after noticing that women needed a loyal pack of cohorts who would help them advance and better engage female customers. At Best Buy, a 'WoLF pack' is a group of 27 people (25 women and two men) who come together from all parts and ranks of the company. Together, they network, brainstorm and focus on

the fact that women make up roughly 45 per cent of all retail consumer electronics purchases in an industry built by men for men.

The WoLF packs have paid off. More than 20,000 female customers and employees have been pulled into the effort; the number of female job applicants has increased by 37 per cent; and female-employee turnover has dropped by 5.7 per cent. Quarterly events let participants volunteer their time back to society in the form of events and fundraising. WoLFs can also mentor individuals or packs in another part of the country, and their efforts have organically led to a job-share pilot program.

In the realm of systems at scale, WoLF exemplifies an ecosystem developed to a point in which each component can give back as a valued shareholder in the form of consumer information, new products and volunteer work. The quid pro quo or social contract for this kind of giving back must be carefully considered. Esteem, visibility, and pride of affiliation are the currency of being part of a WoLF pack, part of the community.

Wikipedia, as its founder Jimmy Wales explained in a TED Talk in 2005, wouldn't work if its editors were paid. The system benefits from people wanting to feel valued and employed to make a difference in the organization through an authentic, personal way that cannot be bought.

As these examples show, the forces around any endeavor result in its ultimate design. Oftentimes, in order to manage the complexity of what we chose to bite off in a project, we frankly leave much of the design to chance. As Mission Pie's Heisler suggests, the community – its people and all its components – is a manifestation of the system. The question isn't, Do organizations get the system they deserve? Rather, as a creative thinker, How can you design the system your organization deserves? Can you acknowledge and own your part in effecting and improving the overall organization, not just one element in a system filled with silos? The underpinning promise of a human-centered approach is that designers can rely on people and their behaviours and the things that entice them to find large-scale solutions that fit with – and thereby change – the bigger world around them.

Let's face it: in order to take on the design of really big solutions, creative thinkers need to tap the most powerful (and most human) of design tools: optimism. By its very nature, thinking like a designer requires us to believe that we can change things for the better. Thinking like a designer keeps us from becoming stunned by the complexity and seeming impossibility of a goal. It also allows us to create a balance, from the big view to little view, and involve stakeholders, even those at the fuzzy edges.

Despite the relative early days of Mission Pie, Heisler is already working with a long list of individuals, from fellow Pie Ranch co-directors **Jered Lawson** and farmer/educator **Nancy Vail** to Mission High kids and the café's bakers, customers, and food distributors to more distant people working on emerging projects that borrow from Mission Pie's approach. Her plan to "lay out the landscape, so people can see the value of the system, the value of community-supported agriculture" allows for both freshly-baked pies on a daily basis and impact in the realms of education, health, and farming over time. The long view, optimism, and determination leads to systems at scale that work and adapt, while making their shareholders proud participants.

In closing

Systems at scale comprise a series of methods for directing behavioural change on a large scale by inspiring people to embrace a system as a shareholder. In a world increasingly plagued by wicked problems, this is one approach to tackling seemingly-unsolvable problems. **R**

Ilya Prokopoff and Fred Dust are partners at IDEO, in Palo Alto, California. Ilya co-founded IDEO's Transformation practice, which helps clients use the tools and methods of design to work in new ways to address the challenges of the future. Fred leads IDEO's Smart Space practice, the group responsible for helping clients with their strategic and innovation goals around space, real estate and communities.