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Tech Trends for Consumer Products 2013
Elements of postdigital

Preface

Welcome to Deloitte's annual report examining trends in technology put to business use. Once again, we've selected ten topics that have the potential to impact businesses over the next 18 to 24 months.

Developing the list of trends is an ongoing process of primary and secondary research. The process includes:

- Feedback from client executives on current and future priorities
- Input from Deloitte industry and practice leaders
- Perspectives from industry and academic luminaries
- Research from alliance partners, industry analysts, and competitor positioning
- Crowd-sourced ideas and examples from our global network of practitioners

This year's theme, *Elements of postdigital*, examines the convergence and controlled collision of five forces – Analytics, Mobile, Social, Cloud, and Cyber – as businesses move closer to achieving the possibilities of the Postdigital EnterpriseTM, where all five forces are mature, implemented, integrated, and baked-in instead of bolted-on. These five forces offer a new set of tools for business, opening the door to a new set of rules for operations, performance, and competition. IT can deliver engagement and empowerment to business customers, both innovating and industrializing.

The Postdigital era, like the post-industrial era, reflects a "new normal" for business and a new basis for competition. In post-industrial times, we didn't forego industrialization, we embraced it. The Postdigital era is similar, but with digitalization as its core.

It's an uncommon time to have five forces – all newly emerged, all evolving, all technology-centric – already impacting business so strongly. It is an opportunity for IT to deliver extraordinary value via modest investments on top of a strong legacy technology footprint.

Our 2013 report shares ten trends grouped into two categories. *Disruptors* are opportunities that can create sustainable positive disruption in IT capabilities, business operations, and sometimes even business models. *Enablers* are technologies in which many CIOs have already invested time and effort, but which warrant another look because of new developments or opportunities. Enablers may be more evolutionary than revolutionary, but the potential is often there nonetheless to elevate the business game.

For 2013 we have also attempted to personalize our general Tech Trends article to include topics and examples specifically relevant to the Consumer Product industry. While we have maintained much of the rich content contained in the original version of this article, we've specifically included examples from leading Consumer Products companies such as Schwan's (Mobile Only and Beyond) and OfficeMax (Design as a Discipline), and have also featured our collaboration on Big Data with the Grocery Manufacturers Association (GMA).

Each topic also includes an external point-of-view in the *My Take*. This year, you'll also find a new section called *Flying Car Future*, which takes a provocative view into where the trend may be headed in Horizon 3 – and beyond. Last but not least, where we deem applicable, we've included our Consumer Products perspective to share our industry insight on the implications of the respective trend.

Each of the 2013 trends is relevant today. Each has significant momentum and potential to make an impact. And each warrants timely consideration. Forward-thinking Consumer Products organizations should consider developing an explicit strategy in each area – even if that strategy is to wait and see. But whatever you do, step up. Provoke and harvest disruption. Don't get caught unaware or unprepared.

Thank you for your interest in this year's report. We welcome your feedback and questions. To the many executives who have provided input into Tech Trends for Consumer Products 2013, thank you for your time and insight. We look forward to having more of the essential dialog between business and IT.

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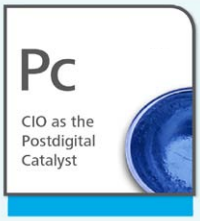
At a Glance

Disruptors

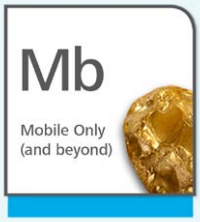
Opportunities that can create sustainable positive disruption in IT capabilities, business operations, and sometimes even business models.



CIO as the Postdigital Catalyst

Catalyzing value from the elements of mobile, social, analytics, cloud and cyber

CIOs can lead the move to tomorrow – reshaping business as usual, and driving innovation. They are faced with unprecedented opportunity for innovation such as the potential to enable Customer Intimacy at scale for Consumer Products Organizations. How should business respond? When CIOs harness the convergence of the five postdigital forces, they can change the conversation from systems to capabilities and from technical issues to business impact. Plan big, start small, fail fast, scale appropriately.



Mobile Only (and beyond)

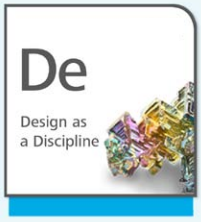
The enterprise potential of mobile is greater than today's smartphone and tablet apps

Mobile should be top of mind for organizations. But don't limit your ideas to Mobile First. Think *Mobile Only*, imagining an untethered, connected enterprise. The next wave of mobile may fundamentally reshape operations, businesses and marketplaces – delivering information and services to where decisions are made and transactions occur. The very definition of mobile is changing – as evidenced by our featured Consumer Products organization that already improved customer service efficiency and quality through the Mobile Only paradigm.

Social Reengineering by Design

How work gets done is no longer constrained by 19th century platforms

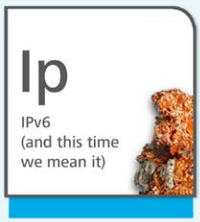
Businesses are no longer building technologies just to enable interaction – they are now engineering social platforms for specific context – platforms that can relieve rather than serve traditional organizational constraints such as deep hierarchies, command-and-control cultures, physical proximity and resource concentration. Social reengineering can fundamentally transform how work gets done, but it isn't just a "project." It's a strategy. It's time to uncover the opportunities for Consumer Product organizations to harness the power of the crowd to augment business operations through external communities.



Design as a Discipline

Inherent, pervasive and persistent design opens the path to enterprise value

Driven by consumer experience, intuitiveness and simplicity are moving from IT aspirations to enterprise mandates. Design is not a phase; it's a way of thinking. Beyond look and feel, beyond user interfaces. Isolated in silos of user experience (UX), marketing and product development, individual design functions may be reaching their limits. What's needed is a collaborative, immersive environment to work together. Design is not just an "IT thing" or a "marketing thing" or a "product engineering thing." It's an *enterprise* thing as evidenced by our featured Consumer Products organization that dramatically improved user productivity and customer experience.



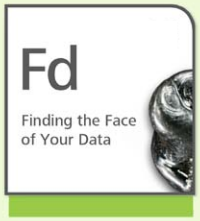
IPv6 (and this time we mean it)

Ubiquitous connected computing is straining the underlying foundation of the Internet

Internet Protocol is the foundation of networking, but we've run out of addressable space for addressable items. The more important it is for your business to connect with the outside world, the more important IPv6 is for your future – and the more urgent this issue is for you today. IP addresses are woven deep into applications and infrastructure, and migration can bring challenges. While there's no drop dead date for IPv6, the final IPv4 address blocks have already been allocated. Careful and proper adoption will take time for planning, execution and verification. The time to start is now.

Enablers

Technologies in which many CIOs have already invested time and effort, but which warrant another look because of new developments or opportunities.



Finding the Face of Your Data

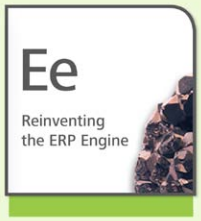
Fuse people and technology to discover new answers in data – and new questions, too

Humans do some things really well, while computers are better at other things. It is this particular combination that enables the identification of new patterns and relationships across dimensions of data – structured and unstructured, internal or external, big or otherwise. By combining human insight and intuition with machine number-crunching and visualization, companies can answer questions they've never answered before. For Consumer Products organizations, Deloitte's collaboration with the Grocery Manufacturer's Association is raising awareness of the business value of data visualization.

Gamification Goes to Work

Driving engagement by embedding gaming in day-to-day business processes

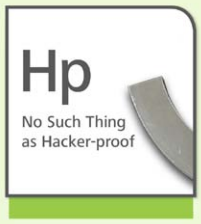
Gamification can encourage engagement and change employee, customer and supplier behavior, creating new ways to meet business objectives. The goal is to recognize and encourage behaviors that drive performance – sometimes in unlikely places. This trend has moved beyond hype and is already demonstrating business value. More specifically, Deloitte's collaboration with the Grocery Manufacturer's Association is exposing the significant potential for consumer-targeted applications (such as in-store gamification).



Reinventing the ERP Engine

Revving up data, hardware, deployment and business model architectures at the core

If you could really get ERP cheaper and faster, what would you do differently? Run materials requirement planning (MRP) many times each day? Close the books in a matter of minutes? Optimize delivery routes on-the-fly in response to new orders, traffic or customer preferences? What would it mean for business agility, capability and competitiveness? If approached with a focus on reinventing business capabilities, the evolution of the ERP engine can yield significant competitive edge.



No Such Thing as Hacker-proof

If you build it, they will hack it. How do you deal with that?

You've either been breached – or you soon will be. Your boss knows it, your business knows it, your board knows it, your customers know it, and hackers know it. It's your job to deal with it. That means changing the way you think about defending yourself. Be more proactive about the threat – and react more rapidly when breaches do occur. Detect them quickly, respond, clean up and adjust your tactics. Be outward-facing, prepared and ready in advance. Anticipate and prevent when possible, but be ready to isolate and encapsulate intrusions to minimize impact. It's better to lose a finger than to lose an arm.

The Business of IT

After reengineering the rest of the business, IT's children deserve some shoes

Fragmented processes and systems can prevent IT from effectively delivering on the changing demands of the business. IT may need to transform its own management systems to keep up. Is this ERP for IT? Maybe someday. Today, CIOs are crafting solutions from industry-leading products and testing business cases at each step. And the potential benefits are worth the investment – not only in driving down costs and better managing risks, but in positioning IT as the business partner in provoking and harvesting disruption in the Postdigital era.

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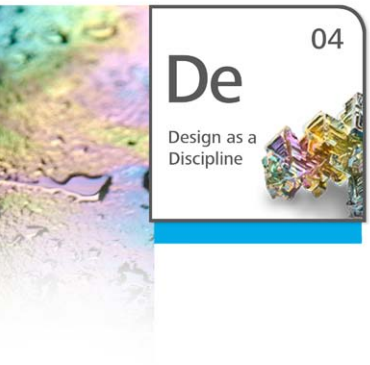
Disruptors



4 Design as a Discipline

Design should be much more than a project phase

Design is already part of the IT vocabulary. Functional design. Technical design. Detail design. Testing design. User interface (UI) design. Technical architecture design. And, more recently, user experience (UX) design – a hot area of focus as consumer technology experiences are resetting expectations for corporate IT. Throughout its history, however, design has generally remained a discrete set of deliverables or project phases, completed by specialized teams at distinct points during a project's lifecycle. Individual facets of design have reflected little understanding of other related project activities, much less the broader context of the business vision and expected outcomes.

Meanwhile, usability, intuitiveness, and simplicity have moved from aspiration to mandate, with the business having access to new ways to get what it wants: directly procuring cloud services, digital solutions, and mobile apps that are "good enough" to meet their needs. In this open marketplace for IT, business relevance and user engagement are competitive currency. Many CIOs find their organizations lack the skills and craft to mint the new coin.

What's missing may be a commitment to design as a business discipline, a commitment that takes shape by asking: *What benefits would we gain if design were a pervasive and persistent aspect of each part of the enterprise?* This kind of thinking moves design from just another software development lifecycle (SDLC) phase to an integral part of the IT environment. It shifts the focus from "How do I meet the requirements?" to "Why is this important in the first place?" and "How could we innovate to improve it?" Enterprises can reach this vision, but it often takes a deliberate approach, intentionally applied, by a new mix of talent. The CIO is positioned to make it happen.

Pockets of disciplined design are emerging, but rarely go beyond the front-end interface. UI is important, to be sure, but design shouldn't stop there. Front-end design is only as good as its foundational architecture – and only as valuable as the resulting user engagement. Poorly designed transactional services, data feeds, social platforms, and underlying infrastructure can derail even an elegant user interface. Utility and ergonomics are important, but not in the absence of reliability, security, scalability, and maintainability, particularly in a hyper-hybrid cloud environment[1]. Jack Dorsey reflected on the artistry and imagination behind the Golden Gate Bridge, but one of its most important features is rarely mentioned: resiliency. Seventy-five years later, the Golden Gate Bridge is still standing[2].

A mind shift is likely required to start the process. Think "system" as in *systemic*, not as in *software*. Focus on designing experiences, not just user interfaces. Zoom above the development lifecycle and look at design as a cross-cutting discipline. It's not an "IT thing" or a "marketing thing" or a "product engineering thing." It's an "enterprise thing." New skills, capabilities, tools, and methods are often required to sustain the journey. Taking ideas from the fields of architecture and industrial design, or from the application of anthropology and behavioral psychology, into each stage of solution definition, ideation, and realization. Multi-disciplinary teams should practice concurrent design in a highly collaborative model, blending creative, UX, engineering, and functional knowledge to encourage the cross-breeding of ideas. Transparency is the ultimate design objective – where the UI is invisible and things just work.

Consider the banana – a nearly perfect design. It fits perfectly in the user's hand. No manuals are required to understand or use it. The packaging is non-slip, easy-to-open, and bio-degradable. And it dynamically communicates status information. The skin color broadcasts its readiness for consumption – green is too early, brown too late, yellow just right. An unconventional example? Perhaps, but it illustrates the point. And you can expect that it will likely be both challenging and humbling for technology designers.

IT can create a new niche for itself by cornering the market on design. On the front-end, on the back-end, creative, user experience, applications, services, data, and infrastructure. Design weaponized as a repeatable, deliberate approach. *Design as a Discipline.*

History repeating itself?

Design has spurred research and debate throughout the modern industrial age – historically by visionaries such as Horst Rittel, Bryan Lawson, and Nigel Cross, and today by the likes of Dieter Rams, Philippe Starck, and Frank Gehry. Design also has a presence in many top companies, though often as something that lives between sales and marketing, and less so as a set of skills or underlying core competency across a business' functions. Too often design has been relegated to a phase of a project, or a silo of activity, with fixed inputs and outputs to the rest of the organization.

	What were the challenges?	What's different in 2013?
Design thinking	• *Design thinking* is an old term that has seen a resurgence of interest. Coined by Herbert A. Simon in 1969[3], it has gained recognition in recent years through the work of the design firm IDEO[4], as well as programs such as the Hasso Plattner Institute of Design at Stanford[5]. Agencies and product vendors are trying to capitalize on the new-found popularity – crowding the market with different messages on the what, why, and how of design thinking. • Design thinking is often interpreted as a distinct process, prescriptively combining divergent and convergent ideation, anchored in achieving a well-defined goal. In this model, design thinking can become compartmentalized, as opposed to a new, holistic, disciplined approach.	• *Design as a Discipline* represents a systemic expansion of *design thinking*. It looks at the important intersection between creative, business experience, domain knowledge, and technical engineering – creating shared language, shared approaches, and shared goals toward problem solving across the enterprise. • Design as a Discipline can knock down the compartmentalized boundaries of design thinking, moving beyond product marketing and R&D to various parts of the organization. Shifting to an enterprise-wide conversation – where each project strives to include creative, business, and engineering talent. It can take an iterative, experimental, and experiential approach across the technology lifecycle – from portfolio planning and requirements gathering to new capabilities around monitoring, improvement, and release planning.
User engagement[6] / User empowerment[7]	• User engagement emphasizes working backward from an end-user persona to guide experiences that get automated. The mantra of designing from the user-down – not system-up – continues to hold true. The danger lies in stopping at the front-end or focusing on creative and user-interface components without understanding downstream, back-end implications. • User empowerment adds to user engagement the forces of consumerization and democratization of IT. Users and customers expect to get technology from the enterprise that is at least as good as the technology they have at home. And they expect to get it when they need it, without undue time, cost, or bureaucracy. The challenge has become how to be responsive to these demands yet remain true to the disciplines of risk management and quality.	• Design as a Discipline builds on the user engagement and user empowerment mantras – extending the persona-based approach to the underlying data, application, and infrastructure services. • Design as a Discipline shifts from separate, adjunct processes to being embedded in overall solution delivery. Instead of having a separate team working to enable ERP through mobile, usability and user experience design skills are embedded across the entire ERP project, informing not only mobile use cases, but also more conventional threads like business process templates, business intelligence visualization, and interface specifications.

Technology implications

Art meets science at the heart of design as a discipline, but there is still plenty of science involved – in the underlying technology layer assisting solution development, and in the deliberate approach that infuses creativity into the system.

Topic	Description
Digital backbone	The need for a reusable set of services and solutions across an organization's digital domains is becoming critical. These solutions are important building blocks for design as a discipline. Potential areas include content, rights management, mobile, social, web, eCommerce, customer analytics, identity, credential, and access management – as well as heavy sales and marketing capabilities, including customer relationship management, sales force automation, campaign management, and search management. An enterprise-wide digital backbone can accelerate design as a discipline adoption and create clarity about the integrated nature of foundational technologies.
Integration / orchestration	Being able to bring together data and transactional services for end users is a universal need. A detailed integration layer is important to allow tiered quality of service for orchestrating between data and systems and for managing trade-offs between reliability, speed, and performance.
User experience (UX)	UX is an indispensable ingredient in design as a discipline – and it involves much more than abstract aesthetics or screen layout. It involves a mix of field research, the creation of detailed user personas and stories, build-out of service diagrams, information architecture of the actor, tasks, and broader context, and conceptual design of the end-user experience. The desired skill set requires a mix of creative designer and anthropologist, ideally with a layer of specialization based on solution channel (e.g., mobile, web, social, digital ERP).
Agile development	Long ago, industrial design leading practices standardized on close collaboration across multi-disciplinary teams. IT departments spearheading design as a discipline should follow suit. That requires business and domain specialists, creative, UX, engineers, and QA to work together through each phase of the project. A focus on timely development can force the breakdown of project goals into discrete digestible components, with each iteration resulting in a potentially releasable end product. Design will likely evolve as incremental features are built, responding not just to technical specifications, but also to the actual usability, utility, and experience of the end product. Many organizations claim to have dabbled with Agile in the past, but few ever moved beyond an iterative waterfall approach (affectionately known as "wagile" or "agerfall"). Part of the challenge in adoption is likely to include shedding biases, rewiring delivery models, and mechanically building out the tools for new ways of handling requirements, release and configuration management, and testing.
Prototyping	Moving quickly from concept to prototype is a core tenet of design as a discipline. Just as industrial designers use three-dimensional printers to vet potential product concepts, IT departments need the ability to realize working interactive models of potential solutions. HTML5-based frameworks, native mobile development tools (such as Apple's Interface Builder, Eclipse's Graphical Layout Editor for Android, and Microsoft's Visual Studio 11), and third-party tools (e.g., FluidUI, OmniGraffle, and Wireframe Sketcher) are viable approaches. Choose platforms aligned with your overarching digital strategy.

Lessons from the frontlines

Ready for takeoff

The airline industry is a tough nut to crack, with high fuel and equipment costs, shifting demand, and route and airport capacity limiting market growth. In the face of these challenges, Virgin Atlantic Airways has taken a different path to distinguish itself – banking on a strategy of making travel an enjoyable and fun experience.

Virgin's emphasis on design and style permeates the user experience from the moment they book a flight and experience the easy Web interface. The gate terminals offer relaxing lounges which include elevated laptop tables and dining areas featuring local food. On board the aircraft, customers encounter the signature purple mood lighting, custom cabins with chairs that can be converted to beds, an onboard bar, and an interactive entertainment system[8] – all of which are meant to give the feeling of a five-star hotel. These features are the product of concerted efforts to build relationships with other parts of the company and communicate the importance of thinking about design at different steps. The result is intended to be a flight that people look forward to.

Design elements are also included in intangible aspects of customer experience. The company's service design team looks to improve the whole customer service experience by imagining what the entire experience of traveling for customers could be – and then planning service guidelines around that vision. One of Virgin's innovations is the Upper Class Wing, which aims to get customers from limo to lounge in ten minutes. Passengers are picked up by chauffeured car service, checked in using a drive-through process, and then directed through a private security passage to the Virgin Clubhouse lounge area[9].

Virgin Atlantic has worked hard to infuse design principles across the company and deliver a reputation built on customer experience, and the payoff has been dramatic. When the new cabin configuration was rolled out, Virgin Atlantic's market share increased by 2% – or approximately £50 million[10] and customer satisfaction was over 90%[11]. The company has also been recognized with numerous industry awards for excellent customer experience and service awards. Virgin Atlantic Airways continues to take-off through innovation and design.

One more thing

From white ear buds to the rounded rectangular shape, Apple has helped to define technology product innovation for the Internet age. Its minimalistic style can be identified easily – the look of their website, the style of their stores, the layout of their products, and more. Although Apple's design ethic is often discussed in reference to the look and feel of products, almost every aspect of the customer experience is carefully designed to work together.

From the outset, Apple flipped the idea of how to do design on its head. Instead of having engineers telling industrial designers to make components and batteries look nice, Apple first decides how a product will look on the outside, and engineering makes the technology fit the vision. Apple's design process also merges the talent of many different disciplines – from product design to mechanical engineering. The company works closely with manufacturers to select materials, and stretches their capabilities by challenging them to develop new methods[12]. The result is a series of products designed to be easy to use and intuitive, even to users who are unfamiliar with technology.

As consumers demand that technology do more and more, it can be difficult to control technological complexity. Apple products have strictly adhered to a policy of simplicity, and their devotion to design has produced an identifiable brand which has attracted outsized media attention and a loyal customer base. On the first day of the recent iPhone 5 launch, Apple sold two million units and was back-ordered for at least three weeks[13]. In the smart phone industry, Apple earns as much as 70% of the profits in the market. For tablets, the number is 85%.[14] Apple has become one of the most profitable companies in the world, at least in part by making technology accessible and stylish.

Design everywhere (even on your wall)

When looking at Nest, the modernistic consumer thermostat designed by Tony Fadell (the father of the iPod), it would be easy to get caught up in the product's aesthetics. The minimalistic LED display. The ease of use by rotating the entire device as a control knob. The simplicity of menus for set-up and programming. But it's clear that design discipline extends throughout the company. Pre-sales are centered on a simple interactive Web app to help determine compatibility with existing furnaces and thermostat configurations. Installation involves two screws and snap connectors for wiring. A multi-head screwdriver is included in the packaging – with options covering not only Nest's needs, but those you'll likely encounter when removing your old thermostat. A carpenter's level is even built into the mounting hardware.

Control – using the device itself, a cross-platform mobile app, or the Web – is intuitive and consistent. A platform-based operating system allows A/B testing of system menus, letting the company capture user feedback and fine-tune its overall UX. Self-updates and patching are handled via embedded Internet connectivity. And a self-learning function aims for a hands-off approach to energy efficiency – combining analytics of past behavior and sensors to track whether you are home or not – to self-regulate temperatures. The result? Glowing reviews and growing market share[15], in an unlikely product category.

CRM Max

In today's dynamic business environment, users want to improve productivity by seeing all relevant information presented in a single application, eliminating the need for access to multiple systems and documents, so that they can perform daily tasks effectively and efficiently. A cross-platform design framework provides the capability of consolidating data from multiple systems, including ERP solutions, and displaying it in an intuitive way.

This combination can provide a simplified, lean process for the functional user. Not only does the user have visibility to internal company activities, but also to upstream and downstream partner activities within the supply chain. This moves enterprise technology into an era of role-based computing. Putting the end-user at the center of the solution design and providing them the ability to perform all tasks in a single intuitive user interface (UI). The complexity of back-end systems, including ongoing system transformations, can now be made more efficient to users. Putting the user at the center of attention, and engaging the user throughout the iterative design, build and test processes drives adoption and a sense of ownership of the solution. This alone can have a tremendous positive impact on organization change management and training.

OfficeMax redefined and implemented their contact center processes while incorporating industry leading practices for their customer services and telesales division. They replaced their existing CRM system and leveraged a flexible user interface technology to improve user experience.

The solution design for OfficeMax was driven with the contact center environment in mind and this resulted in a fully-integrated UI with all transactional and master data from the CRM system and customer multi-channel integration through telephony tools.

This solution met OfficeMax's circumstances by providing three specific features: Unified front end and user friendly UI, CTI integration, and CRM service functionality. The intuitive UI design addressed specific opportunities to improve process automation, data input quality, and customer transaction times. With a customer-focused approach, OfficeMax achieved an efficient front end design to increase the breadth and quality of customer service outreach with an efficient interface between voice, email, and chat communications. Finally, the new user interface allowed business owners to consolidate workflow process into one system and reduce routing and data errors.

By leveraging design as a discipline to help redefine and implement the contact center processes, OfficeMax has achieved:

- A 66% increase in agent productivity.
- Enhanced user experience with 60% fewer clicks to complete calls.
- Unified communication enabled through multi-channel (phone, chat, e-mail, and fax) interactions.
- Fully-integrated agent-facing UI with a one click 360 degree view of the customer.
- Real-time analysis through dashboard reporting.
- Redesigned IVR providing increased customer value.

My take

Emily Pilloton
Founder and Executive Director
Project H Design

I live and breathe and bleed design – but I'm also extremely critical of the formal discipline and programs commonly taught today. I grew up making things, and got into design because I thought it was about creative problem solving. In school I became disenchanted with how architecture and product design felt disconnected from real world challenges. That's why I started my own nonprofit to practice the kind of design I believe in: the nitty-gritty, rigorous problem solving, physical, making kind of design.

I teach design and construction skills at REALM Charter School in Berkeley, California. Dubbed "Studio H," it's an engaging program that develops very marketable people, but it's not about resume building or vocation. It's about enabling the 4 Cs of design – critical, creative, complex, and communicative skills.

Previously, I taught the same Studio H program in rural North Carolina with students who had never taken an art class and could not even read a ruler. After 12 months in our program including one summer with us, they had designed and constructed an award-winning building – a community farmers' market for their hometown that created a dozen new jobs and two new businesses. Many of our students walked away feeling like everything is possible, and that they had the tools to make things happen. They learned that you don't need to settle. The designer's "yes, and…" mentality taught them to keep pushing the constraints of the situation and the quality of their own work to create something both functional and beautiful.

While it takes specific training, skills, and experience to be a strong designer, I argue that almost anyone can – and should – use design-thinking principles. I equate it to being able to pull the scientific method out of a scientist's process and apply it generally at work. Some people mistake design as solely about the creative process. It is, but it's also very rigorous. You might have to start your thinking over many times during the design journey, because you don't initially know where you'll end up or which path or paths you should take. You should be comfortable with that. You should be brave, vulnerable, and raw enough to allow change to really happen. You can't be all about control. In many ways, design thinking is antithetical to the modes of operation business leaders have been socialized to use – where things are linear, step-by-step, replicable, and homogenous.

The good news? You don't have to throw schedule and budget out the window. Some of the best designs typically happen within really tight constraints, so use them in a positive way rather than as a shackle. The project in North Carolina had a $70,000 budget for everything – student stipends, permits, contractors, nuts, and bolts – and the students had only 90 days to complete the building. Those constraints pushed the students to make really creative decisions.

I believe you can't design a good product unless you talk to people. We can each be a specialist in our own area and have our own awesome thing. It's more about openness and collaboration and a healthy codependence. A developer isn't taking away from his abilities by talking to a marketer; he's enhancing his ability to do his job. You can't do your own awesome thing well unless you open your arms to others.

Incorporating design as an enterprise discipline requires strong leadership: you need a champion who can help others see the value. Sometimes, those who do embrace design do it with about 10% of the intensity they should. Many people hear "design thinking" and say "I want that in my team." But it tends to become just another meeting people have to go to, and it doesn't permeate the culture.

Design as a discipline is not for every business or organization. It can require being comfortable with being uncomfortable, and innovating at the core instead of around the edges. If you're going to attempt it, then I say "go big or go home." Not everyone needs to get on the design bandwagon, but if you do, get on and stay on.

Flying car future

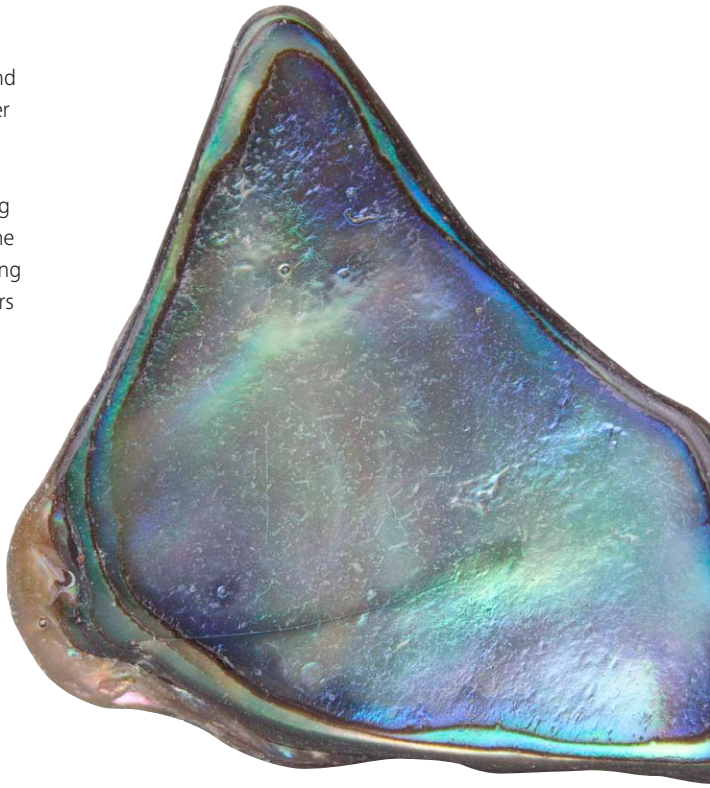
Leonardo Da Vinci established the credo that "simplicity is the ultimate form of sophistication"[16]. Design as a discipline is following this cue – moving towards transparency and smooth integration across computing devices, applications, and increasingly connected physical devices.

Transparency is the evolutionary path of the user interface. We've moved from character-based interaction with mainframe and DOS programs, to mouse-based interaction with client/server and Web-based solutions, to touch-based interaction with today's mobile devices. All require an explicit step of tactile manipulation of a computing node. The future will likely continue the journey, relying on voice controls, gestures, and context – knowing who you are, where you are, and what you're likely trying to do – to trigger ambient functionality. For example, walking through the check-out with your cart full of goods could trigger: facial recognition to confirm identity, calculation of the amount due, searching through social profiles to determine coupons or other promotions, and processing payment from a mobile wallet – all without requiring you to directly interact with any explicit piece of technology.

Behind the scenes, this scenario requires a staggering level of integration – in both the design of solutions to pair user experience with the underlying technical demands, and also across the various components allowing for the end-to-end experience. In the example above, identity and entitlement management services are performing the user authentication, point-of-sale scanners are working with pricing engines to determine amount due for the specific cart of goods, sales and marketing engines are interacting with public social profiles and loyalty services to determine potential savings, and mobile wallet services are interacting with checkout scanners and back-end payment processors to settle the transaction.

Many of these services will likely be designed without knowing exactly how they will be used, or with what systems they'll be interfacing. The back-end aspects of design as a discipline require a services-based approach – at the business level (what problems they're trying to solve) and at the technical level (having a well-defined, contract-based interface compatible with Web services standards). Solution components need to represent equal parts Lego and Play-Doh – well-defined standardized building blocks, complemented by solutions that can adapt to less-prescribed needs.

Industry standards will likely evolve to help unify data models (similar to what FIX and SWIFT did for electronic exchange of financial information in the early 1990s), and technical components will likely continue to support open, standards-based protocols for session management and information exchange. But another turning point will likely be when policies are encapsulated and externalized – the business rules and analytical models that drive the behavior of companies' underlying systems. The "plug and play" nirvana of our flying car design as a discipline can likely be realized only if semantic meanings of data and underlying business logic can be shared and more universally understood – within and across organizational boundaries.



Where do you start?

Design as a discipline efforts often encounter two broad objections. They are seen as either too daunting given existing talent pools, or too nebulous and fluffy. Modest beginnings can lead to profound changes.

- **User first**. Begin by taking a persona-based, user-focused approach – understanding who the stakeholders are, how they live and work, and the context of the problem you're trying to solve. Empathy is critical – from field research on how users are behaving today, to divergent thinking to capture "out there" ideas about how they might behave tomorrow. Design as a discipline prioritizes user stories, conceptual designs, and prototypes to solicit feedback on potential design options using "show," not "tell," techniques – often discovering features and capabilities that would be missed in conventional requirements JAD sessions.

- **Solution design.** It's not enough to focus on gorgeous visuals and intuitive front-ends. Solution engineers should participate in each phase of the project – from up-front visioning to solution ideation to finalizing conceptual design. This helps keep the "art of the feasible" present as concepts are being explored. Technical complexity might be required because of truly differentiated features or complex end-user needs, but it should be a conscious choice. Don't get caught in a situation where technical lightweights drive scoping and front-end design without understanding how to make concepts real.

- **Product mindset.** Similar to their industrial design brethren, IT shops should adopt product marketing and engineering mentalities – committed to frequent incremental releases, with freedom to react in a timely manner to opportunities. Product owners from the business become critical members of the extended IT community – owning the product vision and roadmap. Goodbye bloated once-a-year budgeting and static portfolio prioritization exercises. "Just good enough" releases may become standard, releasing partially complete solutions to garner real-world usage feedback and drive the next iteration of features and fixes.

- **Avoid tissue rejection.** Choose an early business sponsor with simpatico sensitivities. The big picture goal of design as a discipline involves extending across the enterprise at large. But manufacturing or finance might not be the right places to start. Some CIOs have initially focused on marketing departments – groups who appreciate design and UX skill-sets, have grown wary of traditional IT approaches and solutions, but are charged with making massive IT investments as digital changes their worlds. Sales is another good place to start, where you'll likely find vocal user advocates working in well-defined processes with potential improvement from a user-based, design-oriented approach.

Bottom line

Having in-house design knowledge is a strategy to stay relevant to business executives who are enticed by new ways of procuring technologies outside of the CIO's purview – from one-off cloud purchases to departmental and line-of-business technology initiatives. Consumerization and democratization can be threats to the IT department, or they can be the impetus for design as a discipline – moving information technology from its existing cross-roads forward, with intent, to a preferred state.

For corporate IT, design as a discipline is the "so what" and the "or else" of today's consumerization wave. It is a chance to change how solutions are delivered – borrowing from industrial designers and architects – by combining highly complementary skill sets to foster divergent ideation, innovation, and streamlined product build-out. It is also a chance to change perceptions of what to expect from IT, setting a baseline of engaging, elegant solutions that combine intuitive interfaces with reliable, secure, scalable, performing technology stacks. And as importantly, it is a way to bring new approaches to the realization of business needs – showing responsiveness to the new normal of usability in consumer technologies.

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Endnotes

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Conclusion

Faithful readers of our Tech Trends reports will find some familiar topics in these pages. The postdigital forces have seen extraordinary attention in the past four years – and each is still in the early stages of adoption. The book on how each can fundamentally reshape business is still being written.

Although the topics are familiar, the underlying trends continue to evolve at an astounding pace. Take mobile, for example. In 2010 the story was about ubiquitous connectivity and device (i.e., smartphone) advances. In 2011, the focus was on the "app" – and the advent of the tablet. In 2012, we covered enterprise implications for prioritization of opportunities, as well as the operational realities of governing, managing, and delivering mobile solutions. And now in 2013, we consider mobile's place as an utmost strategic priority. The very notion of "devices" is exploding into near-ubiquitous connectivity of many physical objects. The fundamental element of mobile still applies – the innovative idea of removing limitations based on physical location, and of a truly untethered enterprise. But the supporting nuance and details are moving at a rapid clip, making it paramount for IT executives to keep pace with change.

Postdigital's potential can spur both offensive and defensive responses. On one side lies opportunity for innovation. On the other, the existential threat of disruption. Every industry may be affected by the underlying digital forces. Every market may be reshaped by their controlled collision.

Who will lead the charge? The reports of IT's demise may be exaggerated, but there is often truth behind the rhetoric. How will CIOs reimagine their roles in business strategy? What will the corresponding IT department look like? One thing is for certain: the elements of postdigital will play a foundational role.

We close this year's report with the familiar quote from futurist William Gibson: "The future is already here…it is just not evenly distributed." Our hope is that the Tech Trends reports will help you discover the elements of postdigital in your enterprise.

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