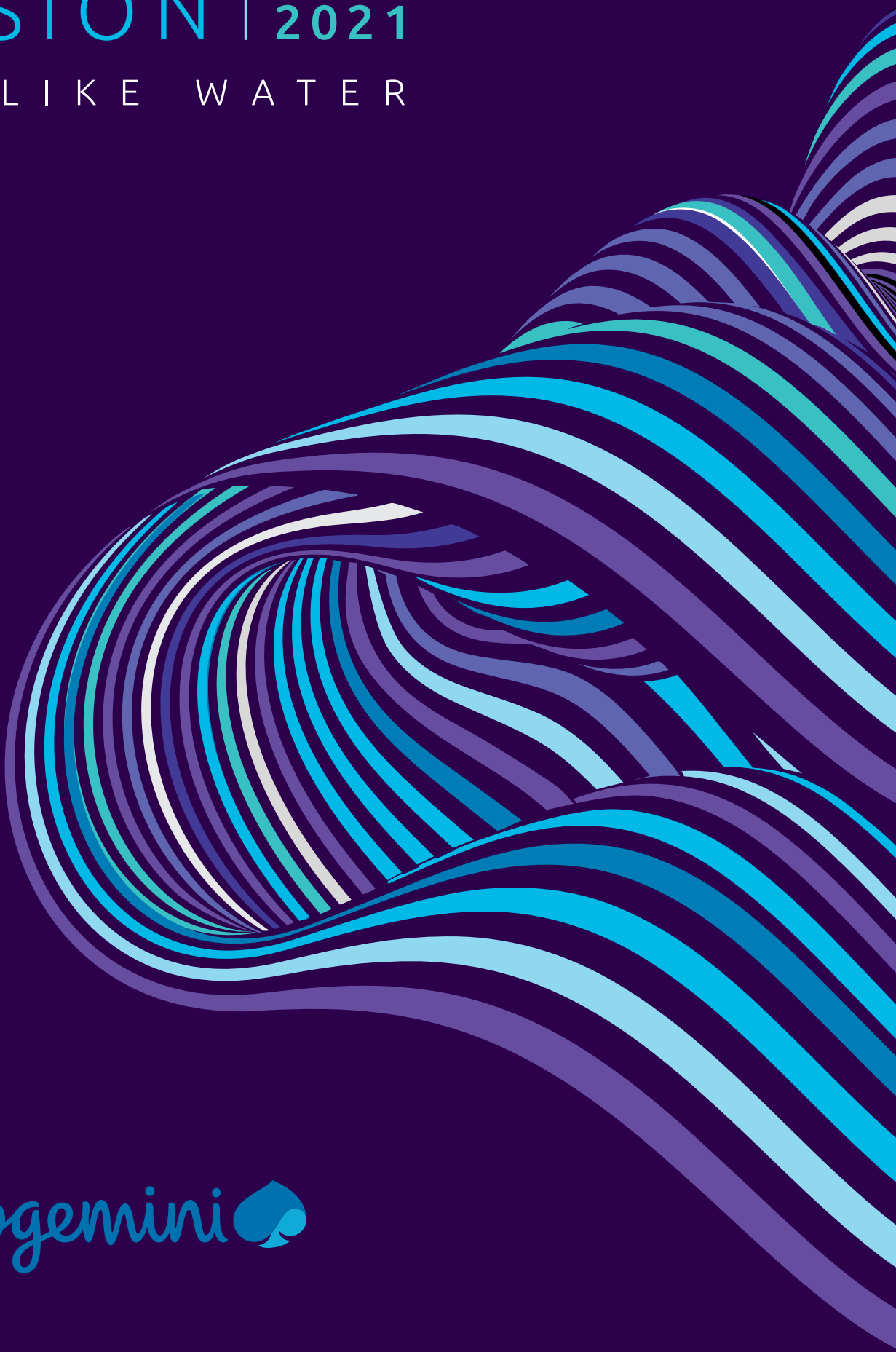
TECHNO VISION | Change Making 2021

BE LIKE WATER



Capgemini

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INTRODUCTION

We like to think that our annual TechnoVision edition is a good snapshot in time, capturing the essence of technology trends and where they will be headed for the year to come. But when we finalized last year's version, no one could have anticipated what was lurking just around the corner. Covid-19 defined an era: the world came to a halt in 2020, carbon emissions plummeted to their lowest levels since World War II, and nature reclaimed empty city streets.

The crisis left business without a market, people without jobs, children without education, and families without their loved ones. The pandemic impacted everything from how we socialized, how we worked, and how our businesses operated. Yet, while organizations struggled to establish new ways of working, people increasingly came together virtually, both in their personal and in their business lives. The one true savior shining its effervescent blue light over a confused, dramatically altered world: technology.

As governments socially distanced people to halt the spread of the virus, technology brought us closer together, facilitating collaboration, creativity and community. The number of people using video-conferencing and collaboration applications boomed overnight. Companies migrated quickly to cloud-based platforms, allowing employees to work remotely without the need for travel. Technology allowed businesses to operate, retailers to sell, and companies to deliver. Payments firms provided speedy, safe and convenient services to millions of consumers worldwide. What once might have seemed a trickle of tech adoption for the few became a flurry of tech absorption for the many.

What we had introduced last year as a thrilling ambition, an exciting dot on the horizon, became reality quicker than we had ever thought; within less than a year, every business became a technology business. Also, every transformation became a digital transformation, and it confirmed our conviction that "digital transformation" is now decisively a pleonasm. This is reflected by our ostentatious omission of using it in TechnoVision 2021, to the extent that we even rebranded our 'Design for Digital' principles to 'Balance by Design'.

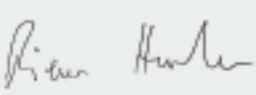
Our expectation of the next story in this ongoing epilogue of life (for what it is worth these days) is that in 2021, we have very few clues what to expect, let alone what to anticipate for. Businesses face a year that is too uncertain to even be categorized as uncertain, in areas as diverse as politics, economy, climate, society, health and technology. Why would you still try to identify black swans when there are no more white swans around?

In any case, technology will be even more pivotal than last year in dealing with a flurry of unpredictable events, challenges, and opportunities. We believe the best way to tackle this uncertainty is by using the main themes of TechnoVision 2021: Be Like Water. By crafting technology strategies, architectures and solutions that are shapeless and formless, yet always flowing – just like water – businesses can go beyond being 'simply' agile, speedy and responsive: they can literally wrap themselves around the cases at hand, assuming these will instantiate, break and renew themselves over and over again in an infinite number of different ways.

We believe this theme is a more than suitable ***leitmotiv*** for TechnoVision's 2021 edition. This release reiterates on the trends of last year's edition – as we do as part of an established bi-yearly cycle – updating descriptions, use cases, and key technologies. Essentially, we reboot the same technology trends in an entirely different world. Our analysis applies the new lens of being like water throughout, exploring how to unleash human energy with technology to create positive futures in the era of Uncertainty^{squared}.

As always, TechnoVision provides a slightly left-field, playful approach to achieve this objective, using a rich, ever-expanding palette of different techniques. If nothing else, we hope it brings you some fresh thinking to address the technology business issues of today, and helps you prepare for what comes next. Whatever that may be.

Become the solution. Be like water, friends.



Pierre Hessler

Ron Tolido

Gunnar Menzel

BE LIKE WATER

Cultural icon, Bruce Lee - quite possibly the most famous martial arts star of all time - faces his final opponent in the movie *Way of the Dragon* against the backdrop of the Roman Colosseum. His rival is played by the very robust Chuck Norris, who is synonymous with power and invincibility. He appears unbeatable, even by Bruce Lee.

At first, Lee relies on a more formal, conventional way of fighting. This approach draws on the way he has trained for years and what has proven to work on many occasions. But it does not work at all against Norris; the stronger, faster and more experienced counterpart. Lee is beaten time and again; dizzy, confused, almost defeated. Norris smiles commandingly, certain of victory. Then, Lee stands up once more. He drastically changes his style, shuffling his feet back and forth, moving side to side, forward and back, bouncing and tiptoeing around his opponent, delivering flicking jabs from unexpected angles. Much like Muhammad Ali, really: Float like a butterfly, sting like a bee. Norris has no answer to this radical shift in approach, and is dealt with decisively in minutes.

This fluent mix of using whatever comes in handy to deal with the situation would become a trademark of Lee. He describes it poetically in arguably his best-known quote:

Be like water making its way through cracks. Do not be assertive, but adjust to the object, and you shall find a way around or through it. If nothing within you stays rigid, outward things will disclose themselves. Empty your mind, be formless. Shapeless, like water. If you put water into a cup, it becomes the cup. You put water into a bottle, it becomes the bottle. You put it in a teapot, it becomes the teapot. Now, water can flow, or it can crash. Be water, my friend".

- Bruce Lee

Uncertainty squared

Although almost five decades old, Lee's quote seems to be made for the context of today – an era we refer to as Uncertainty^{squared}. This is a time in which 'Uncertainty' just seems to be a very weak, pitiful attempt to describe what is going on. Covid-19 has obviously changed the world; its mid- and long-term impact on the economy, markets and business models is yet to become clear, if it ever will. Climate change, although seemingly and temporarily on the backseat of government and corporate agendas, is bound to bounce back with a vengeance, taking more priority than ever before. Political, socio-cultural and societal balances are shifting in unpredictable ways. Strategy, planning and architecture now seem inadequate tools, relics from the past at best, for dealing with a continuous flurry of unexpected and unprecedented events. And this is even more true in the context of technology, where breakthroughs in AI, intelligent automation, the Internet of Things, 5G, immersive experiences and distributed platforms (and maybe soon, quantum computing) bring raw, unexplored change potential.

The pandemic necessitated the acceleration of technology-driven transformation plans in many organizations. Online channels were opened, data was shared, cloud migrations carried out, remote working enabled, sensors activated, APIs exchanged, mobile applications unleashed, and virtual collaboration was mastered.

At the outbreak of Covid-19, the adoption of technology was more a matter of survival and continuity. Later, it was about being resilient in a newly settled business reality. Soon, technology will fuel a renaissance – a reimagination of business models, and a reordering of new and existing players in a rapidly evolving, technology-driven economic network.

StratOps: always be changing

In order to thrive in the era of Uncertainty^{squared}, businesses must fluently adjust their strategy to the disturbances, failures, challenges and opportunities they encounter. Even more so, organizations must be able to seamlessly execute any adjustments, transforming both business and technology in one continual unending flow.

Let's refer to this as StratOps: what if we would apply the DevOps approach enterprise-wide to achieve continuous strategy development and delivery?

Just as we have learned from years of applying agile ways of working and DevOps, StratOps will depend on a tiercé of a powerful, highly automated technology platform, cross-discipline teams and a healthy, culturally established appetite for rapid change. An enterprise that adopts a StratOps approach, that can deal with a shifting business context, disturbing challenges and arising opportunities in equal measure, can literally see itself as renewable – easily morphing to a new state – and portable – smoothly readjusting to a changing external context.

Rebooted

We believe a StratOps enterprise will be like water: shapeless and formless in its organizational setup, and enabling technology to successfully face whatever it comes across, yet powerfully flowing to achieve its objectives and key results – and ultimately fulfill its corporate purpose.

Being like water provides us with a brand-new lens to view our technology trends in this edition of TechnoVision. Some trends remain the same, but they are rebooted in this dramatically different world. Travelling through TechnoVision's overarching trend 'containers' – from infrastructure and applications, via data and processes, all the way to user experience and collaboration – we see new technology business stories emerging.

These stories are built on technologies that provide water-like scalability and elasticity, real-time sensitivity of what is happening in the outside world, but also the speed to deliver and adjust solutions ultra-rapidly. They are woven together using high-value data, insights and algorithms, plus intelligent process automation. They allow for instantaneous decision making and fluent acting, all completely autonomously if required. They tell of immersive, personalized user experiences that bring us right to the heart of real-life action, intertwined with new ways of sharing and collaborating between upcoming and disappearing players. Finally, these stories are held together by powerful design principles that provide balance and direction, even when stakeholders, technologies and priorities shift positions frantically.

Let's have a detailed look at the future of the technology business through this compelling lens:

IT Infrastructure: omnipresent, elastic, autonomous

Like water, IT infrastructure must be fluid and flexible to the demands of the technology business. This infrastructure needs to be delivered anywhere, although most likely through cloud platforms. To flow uninterruptedly, it needs to tap into a connected, always expanding and changing network of people, systems and organizations. It also covers 'things' devices and sensors at the very edge of the IT operations scope; the new hotspot where unexpected change happens the most and instant responses are key. Fundamentally, this fluidity illustrates why the use of the name 'infostructure' in TechnoVision is far from a spelling mistake.

Infrastructure becomes hyper-virtualized and containerized, as the main ingredients to becoming shapeless and formless, even invisible. Now infrastructure is almost fully software-driven, rock-solid secure, automated and orchestrated by code, any hardware configuration, storage provisioning and network configuration is seamlessly managed through software.

When the pace and complexity of change requests and potential threats becomes too much for IT departments to handle, AI comes to the rescue. If, as Nicholas Taleb suggests, the pinnacle of being 'antifragile' is in self-learning, self-healing, self-optimizing systems that are resistant to disturbance and attack, then the IT infrastructure is where this theory becomes manifest.

Applications: meshed, headless, augmented

Applications development is an area that has already pioneered capabilities for years that we would deem typically water-like. Agile, DevOps and continuous delivery have been paving the way towards the creation of an always up-to-date, flexible portfolio of application services. Even APIs and microservices, which are now evolving towards a distributed service mesh, are a testament to radical portability and adaptability, both inside and outside the organization. What if strategy could be as smoothly delivered as a software update?

Applications need to be as easy to use as possible, delivering swift, accurate responses to whatever business requirements arise. Headless applications – as in chatbots and voice assistants that replace established application user interfaces – can deliver that radical portability, as they are built from the ground up to understand and deliver on the intention of the user as quickly as possible, without any filters along the way.

And returning once again to the desirable end state of self-learning, self-optimizing systems, AI augments both specialized software engineers and citizen developers in building next-generation applications without (or almost without) any coding. From there, it is only a short step towards applications services that learn from flaws and new needs, coding or recoding themselves automatically.

Become the solution

BE LIKE WATER

Data: algorithmic, federated, shared

There's no business like a data-powered business. Data – when combined with the raw, elastic capabilities of the cloud – powers resilience, performance, innovation and renaissance-style breakthroughs in every business play. AI algorithms are instrumental to shaping an enterprise that detects and predicts complex patterns earlier than human beings, before taking appropriate, automated actions instantaneously. A technology business that wants to be like water needs AI – and AI needs training data to learn and to improve. The business must create a continuous flow of this training data, whether it comes straight from ongoing business operations, from external providers or even synthetically generated.

Whatever industry, whatever domain, data only delivers value when it is shared and collaborated on with others, internally and externally. The marketplace will always find new ways to use data to thrive and grow – even when it is threatened unexpectedly or finds itself in unexplored territories. Data platform architectures must evolve to reflect this reality. Businesses have already spent years moving away from inflexible, monolithic enterprise data warehouses towards more flexible data lakes (some water there, actually). Now, new data mesh principles and technologies acknowledge the distributed nature of data ownership and the value of exchanging data as a high-quality product.

Process: binding, portable, self-driving

A water-like flow within the enterprise depends on the ability to turn insights into action, to quickly respond to events, to overcome business silos, to seamlessly ride the waves and to rapidly change directions if circumstances so dictate. This is where process technologies deliver: fluid, agile, reactive and yet proactive, and ultimately able to self-adapt to weather every storm.

As a certified silo buster, process technology bridges the gap between the waters of corporate – or intercorporate – systems without intruding upon them. As the next-generation solution builder, process technology is the glue binding microservices and APIs together into something we might have called 'applications' in the past. In its robotic incarnation, it automates tedious, error-prone human interactions with screens, providing an always-on responsiveness. This automation also elevates knowledge workers to more inspiring, higher value work.

The same combination of sensor-style, real-time capture and analysis of data with cognitive process automation capabilities that we see in Intelligent Industry is also relevant to core enterprise management processes, such as human resources, finance and administration, procurement, and supply chain. Business processes become configurable and portable: easily adapting to a rapidly changing context, both internally and externally. The only question – how long will it take before we see the first autonomous, touch-free, self-driving enterprises, humans optional?

User Experience: immersive, low-touch, emphatic

The user experience is intimately at the heart of an enterprise and its target audience. Yet it is quickly migrating, as preferences, players and positions change on a minute-by-minute basis, exacerbated by the accelerated move to online, 'no-touch' channels. Hardly an easy environment to build a solid understanding of what is driving the user it seems, let alone to develop a deep, mutual, emphatic relationship and an experience that wraps itself fluently around the user's intentions.

The good news: finely tuned real-time data, smart algorithms, intelligent automation, the IoT and immersive technologies, such as AR and VR, all enable the creation of hyper-personalized, compelling experiences that can be delivered through a wide range of channels. Businesses can reduce the need for on-site engagements using immersive technologies, helping users to feel physically closer than they really are, while also addressing social issues caused by the lack of any direct personal presence.

Ultimately, we see a new horizon of the ultimate 'you' user experience; one where the customer becomes more or less one with the experience. As futuristic as it all sounds, this new realm relies on technologies that are already on the shelf or will be mainstream soon. Water is nearby.

Collaboration: teamed, distributed, creative

As humans and 'things' becomes intimately networked with superior, simpler and ever-more ubiquitous technology, and an abundance of social and distributed platforms, it is time to tap into the phenomenal potential of Technology Business collaboration. Even more so when connections and entire ecosystems seemingly change overnight.

Driven by the pandemic, the collaborative team space is quickly taking over the role traditionally held in the workplace by the individual desktop. Employees now routinely communicate over virtual channels. They are accustomed to working collaboratively on a shared team canvas, rather than in focused silos. As a result, nimble, portable teams emerge from the waters.

Distributed platform technologies enable the setting up and changing of safe, transactional networks between established and ad-hoc partners, overnight if necessary.

Using data-sharing tools, even the hardest competing businesses start to share their data for analytical purposes. Add a little AI to the human mix, and you find limitless potential for spectacular creativity.

Keeping it balanced

As we systematically comb the technology trends seascape for pointers on how to become more like water, it is best to keep in mind that technology itself does not change people, nor does it change organizations. Not even now, as every business has become a de facto technology business. TechnoVision's seven design principles have always provided guidance to the architect, strategist, innovator or transformation lead on the 'how' of change-making with technology.

In light of the challenges of the Uncertainty^{squared} era, we feel that our new design principle Adapt First – as a plea to anticipate change and brace for disturbance right from the start of any initiative, rather than apply it as an afterthought – is apposite.

We also introduce the notion of Technology ∈∋ Business (which could be pronounced as 'Every Business is a Technology Business') as a stark reminder that no technology business can thrive on 'just' alignment – let alone a divide – between business and IT, and between the real and virtual worlds. We like to think that the same is becoming true between collaborating enterprises as well.

Above all, it's the What's Our Story? design principle that keeps change going. A compelling company purpose – a raison d'être that is wholeheartedly told and retold by every living soul in the enterprise – is the undisputed champion of technology-driven transformation. And that is especially true in a time of conflicting challenges and opportunities that seem to ripple through from all sorts of unexpected places, over and over again.

After all, water is not only just standing still. It is almost always trying to go somewhere.

Let us return to Bruce Lee, who teaches a young apprentice in his later movie Enter the Dragon. He points towards the sky. The apprentice looks at Lee's finger and immediately gets slapped on the head. "It's like a finger pointing away to the moon," explains Lee. "Don't concentrate on the finger or you will miss all that heavenly glory."

Overview of **TechnoVision**

TechnoVision categorizes technology drivers into six containers that cover the ‘what’ of Technology Business trends and one container of overarching design principles, the 'how' of creating a balanced Technology Business.

Two core containers cover trends in the foundational building areas of infrastructure and applications, aptly named **Invisible Infostructure** and **Applications Unleashed** respectively. Two more form the spine of any innovative IT household, **Thriving on Data** for leveraging data and **Process on the Fly** to leverage processes. The final two containers cover channels to the outside, connected world, **You Experience** for creating seamless, individualized user experiences, and **We Collaborate** to tap into the power of social connectivity.

There is one final container of overarching design principles (the ‘how’) that should be kept as part of a mindset – and a powerful checklist to apply – throughout the journey towards becoming a fully portable, continuously flowing, and well-balanced Technology Business: **Balance by Design.**

The 37 building blocks are all described through one-page summaries, designed to be crisp and to-the-point on the one hand, yet appetizing enough for further study through its links and case stories. Each building block contains an elevator pitch to briefly describe the trend. Then comes the ‘what’ (a slightly more elaborate description), the ‘use’ (actual use cases), the ‘impact’ (potential business effect of the trend) and ‘tech’ (links to leading technology solutions and other relevant information).

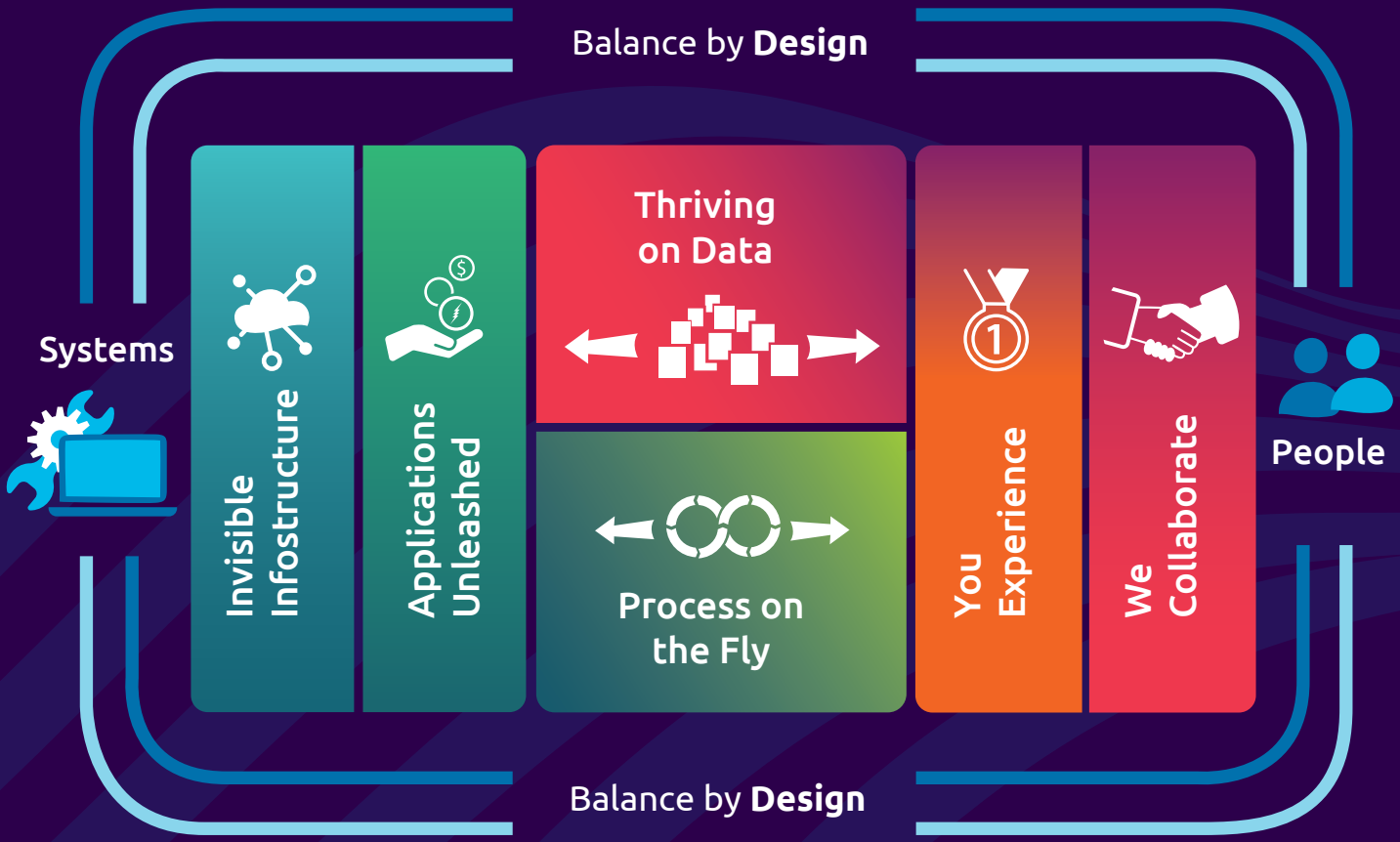
The seven **Balance by Design** principles are also introduced through an elevator pitch, but then shaped into something much more tangible. Firstly, outlined with a clear definition, the ‘why’ quickly follows, discussing the purpose and benefit of adopting it. Then comes what is needed to put the principle into practice, before the simple measurements required to track the principle in business.

But because not all treasure is silver; the authors have had their fun hiding copious references to rock, pop, movies and other cultural and societal phenomena. The reader is invited to find as many of these ‘Easter Eggs’ as possible. It should not be ruled out however, that millennials and their ‘OK, boomer’ colleagues – blessed as they are with quite different frames of reference – may find completely different hidden gems.

If you still possess an unabated appetite for more, the TechnoVision Expert Connect community caters for a variety of detailed posts and articles about your favorite 37 building blocks. Or, if you are lucky enough to run into the colorful TechnoVision cardboard boxes, scan the QR code on each block to take you directly to the relevant materials. We also invite you to join any virtual session or look further into Applying TechnoVision, to dive deeper with us. Come on in, the water’s fine!

Overview
of TechnoVision

The TechnoVision 2021 Technology Business trends:



Overview
of TechnoVision

The TechnoVision 2021 Technology Business trends:

Invisible Infostructure

Evolving the IT Infrastructure into the simple, pluggable utility it was always supposed to be.

- The Soft, the Hard and the Virtual
- Crouching Tiger, Hidden Container
- Simply the Edge
- Ops, AI did it Again
- Ceci n'est pas une Infrastructure

Applications Unleashed

Liberating the legacy application landscape and unleashing the next generation of powerful, agile, cloud-based apps.

- Kondo My Portfolio
- Bot is the New App
- When Code Goes Low…
- API Economy
- Apps ♥ AI

Thriving on Data

Leveraging data and algorithms as an asset to increase the "Corporate IQ".

- Crazy Data Train
- Power to the People
- Good Taimes
- Data Apart Together
- How Deep is Your Math

Process on the Fly

Building, managing, and running processes that match the dynamics of the digital outside world.

- Processes 101
- Rock, Robot Rock
- Can't Touch This
- Pleased to Meet You, Process
- Augmented Me

You Experience

Creating seamless user experiences for decisive, magical moments.

- Signature Moments
- Reality Bytes
- Own Private Avatar
- I Feel for You
- No Friction

We Collaborate

Tapping into the power of the connected and collaborative "everything".

- The Team is the Canvas
- Fluid Workforce
- New Chain on the Block
- Use the 5G Force, Luke
- Creative Machine

Balance by Design

Overarching design principles to be followed and checked for a Technology Business to become flowing, adaptive, and responsive.

- Adapt First
- With Open Arms
- Technology ∈∋ Business
- IQ EQ CQ up
- Trust Thrust
- No Hands on Deck
- What's Our Story?

INVISIBLE
INFOSTRUCTURE

INVISIBLE INFOSTRUCTURE

Invisible **Infostructure**

The infrastructure part of the IT landscape is a crucial foundation for any organization with business technology ambitions. Although increasingly invisible to the naked eye, it needs to provide fast, secure, agile and cost-effective access to any data or application service. Like water, it should be fluid and flexible to the demands of the enterprise. It simply needs to be delivered anywhere, whether on or off premise, through the cloud or not. To flow uninterruptedly, it needs to tap in into a highly connected, always expanding network of people, organizations and things – clearly illustrating why "infostructure" is not a spelling mistake.

Dapo Adekola
Expert in Residence

The future of infrastructure – like so many final innovation destinies – is to become truly invisible. This means that we can consume infrastructure right from the catalog; we can use pre-defined services and workloads that support us like a truly hassle-free and Lego-style utility, satisfying current and future technology business objectives. Combine this with the incredible richness of data – increasingly through sensors, mobile devices and lots of 'things' – and you start to get both the 'invisible' and 'infostructure' parts of the equation.

The key to an invisible infrastructure is keeping to the 'as a service' principle, covering both the more traditional, as well as cloud-native deployment scenarios.

In this dynamic and ever-evolving technology business environment, business models are demanding agile and continuous delivery of applications and data to support new and existing services. IT needs are rapidly and ever-changing, across custom developed applications, COTS applications, large-scale ERP solutions and SAP alike, disrupting the infrastructure 'norms' as we know them, in design, deployment and operations.

Traditional infrastructure becomes hyper-virtualized and containerized. Disruptive forces, shaping and molding innovation as water in a vase, create 'invisible infostructure' platforms that are fully software-driven; fully secure, automated and orchestrated by software code. Any hardware configuration, storage provisioning and network configuration is managed through software. No longer are we exposed to complexity, as abstraction and automation allow for a simpler way of consuming infostructure capabilities, regardless of where it resides.

Observing our Infostructure for a moment longer, we find that design, deployment and automation of platforms are simplified, facilitating a democratization of infrastructure delivery to consuming development teams. A 'new norm' emerges from the waters, featuring jointly orchestrated service components, edge devices, objects and APIs, each with logging and monitoring requirements, all unlocked with innovative AI-driven operations.

Peek inside your new Invisible Infostructure and you're bound to find a well-tuned world of containers, virtual machines, cybersecurity bots, storage, networks and cloud services being orchestrated and automated along a secure and continuous pipeline of changes. Changes demanded by consumers and platform specialists alike. It delivers the speed, availability and reliability needed by today's technology businesses in a responsible, secure and environmentally friendly way.

And as we enter the era of 'serverless' solutions that do not appear to require any infrastructure at all, the invisibility cloak is complete.

The Soft, the Hard **and the Virtual**

Infrastructure turns virtual, software- driven and automated, delivered as easy-to-consume services

What do you do in an intense standoff with IT infrastructure that gets more complicated and unmanageable by the day - while it's trying to steal all your money? Well, send in the Navy. Virtualization is key to standardize, hide complexity and render deployment invisible. Software transforms hardware and everything else infrastructure-related into flexible, editable code. Automation weaves it all together, bypassing tedious, replicable and error-prone human activities, delivering infrastructure services in an instant. Together, they make the unbeatable foundation for a business that moves even faster than its shadow.

Ajith NC
Expert in Residence

WHAT

- Infrastructure is categorized as a utility-based capability, where compute, network, storage and security features are easily contracted, used, modified and deleted without manual intervention or exposure to technical details.
- Virtualizing infrastructure capabilities is a de facto approach, optimizing the use of available resources as well as the benefits from various cloud deployment options, including compute, network and storage.
- With a new base foundation formed from this 'infrastructure platform' paradigm, application development teams can provide succinct and functional business solutions and services.
- Galvanized by the evolution of infrastructure engineering to platform engineering, this closely aligns modern infrastructure provision to the continuous delivery in 'Gitops' approaches.
- Declarative platforms are based on 'soft-coding' components rather than point-to-point configuration and integration of actual hardware. Combined with API, infrastructure is truly programmable.
- Orchestration and automation tools enable repetitive infrastructure platform tasks to be executed consistently time and again, using consumable, managed and monitored scripts, without risk of human error.

USE

- The National Australia Bank (NAB) migrated its NAB Connect platform to the Amazon Web Services (AWS) Cloud. To provide secure and scalable compute capacity to drive a platform for multiple account users, Elastic Compute Cloud (EC2) enabled uncapped payment transfers using PayID, international payments and foreign exchange services.
- Once a very traditional, complex and manual infrastructure environment, a UK-based public sector organization has moved to a fully IaaS-based one, reducing build and service times significantly.
- Replacing a legacy infrastructure that was no longer fit for purpose, the British Army partnered with VMware to deliver a software system enabling the super-speedy development and deployment of applications.

IMPACT

- Increased business agility and time to market.
- Reduced complexity and costs, minimizing technology options and integration issues.
- Infrastructure platform services aligned in real time with business needs
- Diversity of technology and components enables a more elastic approach towards resiliency and scalability, whilst eliminating configuration drift and mitigating risk.

TECH

- Industry standards: OpenFlow, Cisco Opflex, OpenStack, OpenShift
- Virtualization Tools: Hyper-V, VMWare vSphere, Red Hat Virtualization, Citrix Hypervisor, Oracle VM Server, AWS EC2, IBM PowerVM, SuSE Linux Enterprise Server
- Automation & Orchestrations Tools: Ansible Tower, CFEngine, Otter, Puppet, Saltstack, TerraformChef, Red Hat Ansible, vRealize Orchestrator, BMC Cloud Lifecycle, IBM Tivoli Provisioning, IBM Cloud Orchestrator, Microfocus Orchestration, HPE Cloud Service
- Cyber Security related: Akamai Kona, Arena ITI, AWS Security Hub, Azure Information Protection, Black Duck, GCP Command Center, IBM QRadar Advisor with Watson, Symantec

Crouching **Tiger**, Hidden **Container**

All the complex infrastructure an application needs to run on, nothing to see but containers

Infrastructure can be intimidating, showing its claws through different versions of operating systems, devices, connections, configurations, files, middleware and other foundational elements needed to run an application. What worked yesterday may be extinct tomorrow, as even the tiniest change to infrastructure can bring the mightiest application down. Enter containers; they simply package an application with the infrastructure, middleware and platform service components needed into a sealed-off, air-tight, standardized box. Any cloud, server or PC will then be able to run these containers, making them the silent masters of infrastructure. Crouching Tiger, Hidden Container – don't underestimate what's in the background.

Cornelia Görs
Expert in Residence

WHAT

- Container Management Systems can control thousands of containers simultaneously on both private and public cloud, enabling the automated operation, management and orchestration of an extensive environment from one single control point.
- Containers provide the ability to run small to very large domains entirely autonomously, encompassing not only the operating system, but also middleware and applications.
- Operating systems and components (such as middleware and platform services) are maintained in a holistic and automated way, by managing the version and configuration information.
- Containers are paving the way to an invisible infostructure, to be able to orchestrate and support a microservices approach.

USE

- Ford Motor Company provided mobility solutions at accessible prices to its customers, dealerships and parts distributors. Using a container-based application platform to modernize legacy applications and optimize hardware use, the company has significantly reduced hardware costs, enhanced security and improved productivity.
- Pearson, a global education company, chose Docker container technology and Kubernetes orchestration as the main technology of the Pearson education platform.
- PayPal has migrated mission-critical workloads to Google Cloud providing personalized financial services such as mobile payments, credit, remittances, working capital and card processing for 300-million accounts in 10 different currencies, across 200 markets.
- Ericsson uses cloud native and several open source technologies including Kubernetes in their portfolio to address the needs of 5G networks.
- The Cloud Container Engine of the German Telekom's public cloud (the Open Telekom Cloud) is based on Docker and Kubernetes.
- With Kubernetes, PayIt's infrastructure costs are less than one percent of revenue.
- The U.S. Department of Defense is enabling DevSecOps on F-16s and battleships using Kubernetes

IMPACT

- Large and complex environments are simplified, supercharged and accelerated through the creation of modular components to the landscape.
- 'Payload' moves seamlessly from on-site to a public cloud provider – like AWS, Azure or Google – and back, without impacting end users.
- Containers pave the way to advanced automation and a truly pervasive microservices architecture approach.

TECH

- Industry standards: CoreOS Rkt, Docker software containers, 12 factor applications
- Container technologies: Helm, Kong, Istio, Knative, Zipkin
- Orchestration Platforms: Kubernetes, OpenShift, VMware Tanzu, Amazon Elastic Kubernetes Service (EKS), Azure Kubernetes Service (AKS), Google Kubernetes Engine (GKE), Amazon Elastic Container Service (Amazon ECS), Capgemini Cloud Platform (CCP), Puppet, Chef, Red Hat Ansible, CloudForms, Mesosphere DC/OS

Simply the **Edge**

5G and The Fog expand the edges of IT infrastructure further into the real world, making the digital twins of 'things' more realistic and smarter than ever

5G and fog computing are pushing storage, processing and connectivity power deeper into the physical world and further away from corporate data centers. With potentially every 'thing' at the edge of infrastructure in connected real-time to the network, the vision of digital twins evolves. They become even more precise, trustworthy models of their physical equivalents. Add (artificial) intelligence, and they turn out to be much 'smarter' than their real-life twins. This brings radically different perspectives on how to orchestrate and manage so many more physical assets – and the data it generates – as part of the IT infrastructure. But once the edge is unleashed, it's better than all the rest.

Bernd Wachter
Expert in Residence

WHAT

- The internet of things (IoT) brings a rich infrastructure that connects physical assets to IT systems, often in real time
- Computing is now fluid, with usecases requiring data to flow seamlessly from cloud to fog to edge and ultimately to mist computing in order to meet business needs.
- AI is leveraged to predict their future state and drive their interactions with other assets.
- 'Digital twins' pop up in all major industries, but more notably in manufacturing and utilities, where operational technology (OT) and information technology (IT) merge.
- 5G is opening up the speed envelope, enabling data transaction at the edge interconnecting users, machinery, sensors and other "things" alike seamlessly.

USE

- Daimler launched the world's first local 5G network within its automobile production 'Factory 56' in Sindelfingen, Germany, connecting all production systems and machines throughout the entire Mercedes-Benz assembly process.
- The Swiss center of excellence for agricultural research, Agroscope dedicated 17 strategic research fields (SRFs) to focus on the challenges of the agriculture and food sector, by leveraging the latest 5G, edge and fog technologies for Precision Farming.
- Auckland, New Zealand has increased its 'Smart City' IQ by using sensors in streetlights to monitor traffic flow, easing congestion by analyzing data collected.
- To tackle the problem of lost sales due to out of stock products, US-based grocery chain, Giant Eagle deployed smart shelves in its stores to reduce stock replenishment time by two-thirds and cut the number of out of stocks on any given day by 50%.
- UK leading auto parts distributor, Andrew Page used telematics to reduce speeding by 97%, with a 47% reduction in crashes, and a circa 7% improvement in fuel economy and reduced maintenance costs. (Capgemini Research Institute)

IMPACT

- Benefiting from a real-time connection to physical assets, for route optimization, increased resilience or for improved customer experience.
- Adding value to physical products, e.g. through the provision of usage analytics to customers.
- Creating new business models through the monetization of the IoT and develop a fully immersive experience through a blend of augmented and virtual reality.

TECH

- IoT, 5G and digital twin platforms: GE Predix for the Industrial Internet, IBM Watson IoT, Microsoft Azure IoT Suite, C3 IoT Platform, AWS IoT Core, SAP Cloud Platform for the IoT, ThingWorx IIoT, AWS IoT Greengrass, Cisco Jasper, GE Predix, ptc ThingWorx, Capgemini 5G Research paper, OpenFog
- Connecting the orbit: AWS Groundstation, Azure Orbital
- Open standards: Open Connectivity Foundation, The Open Group IoT Work Group
- IoT marketplaces and communities: IoT Consortium, IoT Talent Consortium, Industrial Internet Consortium, Platform Industry 4.0

Ops, AI Did it Again

AI comes to the rescue of complex IT operations, improving step-by-step efficiency and reliability while it learns, on its way to full autonomy

So many systems, services, devices and applications swarming around in an enterprise IT operations landscape. So much disjointed data available in real-time about how they perform, succeed and fail. It's the perfect playground for AI to get a grip on the complexity, by learning from IT operations data to provide improvement. First by giving better insight into the performance of operations and by real-time detection of disturbances. Then - through predictive analytics and system inference - by anticipating these disturbances and inferring what is occurring inside opaque systems, timely measures can be taken. Finally - when it has found even the most complex, hidden patterns - by autonomously optimizing IT operations. Oops, is that infrastructure simply taking care of itself?

Daniel Koopman
Expert in Residence

WHAT

- AI for IT Operations (AIOps) collects and analyzes IT operations data, often in real-time, to improve observability, continuously fix, and improve IT operations' performance.
- Data to drive AIOps is ingested from multiple and diverse sources including; system logfiles, edge device logs, IT operations management platforms, problem ticket data, connected devices, 'wire' network traffic data and event monitoring / alert systems.
- AI / machine learning and (intelligent) process automation are critical to gather, collect, correlate, learn and resolve unwanted anomalies without human involvement.

USE

- An American sports equipment manufacturer identified the cause of an incident that impacted user experience, on their ecommerce site that they could not see without the observability tools and that traditional APM and logging tools did not expose the issue.
- A fortune 500 US bank found that almost complete visibility of the state of its infrastructure to be able to attain almost 100% uptime and service restoration in seconds, rather than hours in order to retain customers. The volume of change, and the scale of data was too much for traditional monitoring and AiOps tools were needed.
- Implementing AIOps at a leading entertainment company was able to reduce the volume of alerts by over 80%.
- The global ride sharing company with over 3000 microservices being migrated between data centres, was able to identify the cause of a doubling in latency that was having a significant impact on customers.

IMPACT

- A plethora of cloud-native and platform as a service (PaaS) technologies reduce complexity for developers and end-users resulting in visibility challenges for operations teams.
- Automation and AI / machine learning tools pave the way to a full self- service infrastructure platform and applications management landscape.
- Routine, repeatable IT operations tasks are automated, so staff can focus on more strategic, value-adding activities.
- Better delivery of Service Level Agreements (SLAs) and increased customer satisfaction, e.g. through faster problem resolution and fewer outages.
- Training and sustaining AI systems for operational improvement requires new skills and roles within operational teams. As intelligent machines and people collaborate, their skills and roles will evolve.

TECH

- Observability: Honeycomb.io, Lightstep, Splunk, Datadog, NewRelic
- AIOps: MoogSoft, Splunk, IBM Watson AIOps, BigPanda, Anodot, SumoLogic, BMC
- SRE, Chaos and Application Operations: Splunk On-Call, ServiceNow, Gremlin

Ceci n'est pas une **Infrastructure**

Continuously build and deploy the next generation of software services, without even noticing infrastructure

Sounds like a pipedream. But the ultimately invisible 'no' infrastructure is there. Goodbye server room, hello asset-free business. Infrastructure as code, radical automation, software containers, microservices and serverless computing are all paving the way towards retail-style consumption of infrastructure, without being bothered by complexity. With software being continuously developed and deployed on an infrastructure that automatically adjusts and scales, IT infrastructure can finally become the powerful utility it was destined to be; always available, just unperceivable. C'est tout.

Thomas de Vita
Expert in Residence

WHAT

- Virtualization, software-defined networking and data centers, cloud, APIs and software containers are transforming IT infrastructure into a commodity that can be easily orchestrated and procured from a catalog of platform services.
- Infrastructure as code and platform engineering practices put the reigns in the hands of the developer; enabling rightsized, just-in-time provisioned platform services for application and data deployment within 'invisible' infrastructure activities.
- Serverless abstracts hardware from software, allowing the build, construction, deployment and operations of containers, server, storage and network landscapes, without the need to access or manage anything.
- Evolving further into 'NoOps' computing, modern event-driven application solutions are driving the adoption of 'Functions as a Service', where microservices are deployed on fleeting, cloud-based platforms, hidden from the developers and paid for per actual use. The actual infrastructure services no longer matter, nor are they noticed.

USE

- Fujifilm leverages Azure Durable Functions – part of the Azure Functions (serverless) solution stack – along with Face API and Azure AI, to drive unprecedented 'image to name' tagging in sports.
- New Zealand renewable electricity company, Mercury used AWS Lambda and AWS Step Functions to cut customer onboarding times from 20 minutes to 30 seconds, reducing their expected costs to just $20 USD per 10-thousand orders.
- Chicago-based company, Relativity developed a solution using a serverless architecture based on Microsoft Azure, saving weeks of developmental time versus traditional methods, representing a drastic improvement in its ability to solve business-critical problems and focus developer talent where it was most needed.
- AWS Lambda allows Thomson Reuters to load and process hundreds of digital streaming data services and products costs effectively and without needing to provision or manage any servers.
- Google Cloud Platform services like Cloud Pub/Sub, Cloud Dataflow, and BigQuery enable Travlytix to build and run their customer data and personalization engine platform for global airline customers without having to manage hardware or spend weeks on deployments.

IMPACT

- Reducing application delivery complexity, making it simpler to establish and construct full application environments.
- Allowing for little to no upfront IT infrastructure investments, options are noticeably limitless.
- Enabling a more application-centric security construct, enhancing cyber security and enforcing cloud security innovations.
- Open Compute allows re-use, saving time, energy and cost.

TECH

- Open Standards: Open Compute Project Data Center, Open Compute Project Servers
- Serverless computing: AWS Lambda, Google Cloud Functions, Microsoft Azure Functions, IBM Cloud Functions

APPLICATIONS **UNLEASHED**

APPLICATIONS

Applications **Unleashed**

Show me your application services portfolio and I'll tell you about your company. The new reality of a Technology Business - keeping afloat in today's more uncertain waters - demands application services to be built and delivered at high speed and in various incarnations; as close to the business as possible, yet responsive to every demand. For sure, these application services no longer resemble the applications we used to know, even the very notion of user interfaces is rapidly melting away. Although agile working through Minimum Viable Products is no longer the 'new normal', but the 'well and truly established', the quality of applications needs to be at enterprise level, as the trust balance of the organization is always at risk.

Gunnar Menzel
Expert in Residence

The applications portfolio of a thriving Technology Business is lightweight, easy to connect to, and built on the shoulders of typical cloud-native capabilities; predicting and adapting to ever-changing demands and requirements - weathering every storm and floating seamlessly across the corporate ocean. Yet, applying a new applications blueprint is far from straight forward, as existing core systems – often born of another decade – are a reality to all but the youngest startups. To unleash the Technology Business applications blueprint, various steps should be considered:

- Simplify, rationalize and decommission existing applications. Once perceived as differentiating solutions for business growth, these applications have now become an anchor; heavy, cumbersome and slow to move, preventing the technology business ship from sailing out of the storm. Fast and flexible solutions enable a speedy response to change. Standard, industry best practice cloud applications are a quick way to break anchor and set sail. Loosely coupled layers over silo applications are another (such as bots, APIs and RPA). Whichever route you choose, it needs a dedicated captain and the mind of a tidying-up guru to actually get it done.
- Like water flowing through every nook and cranny, add a touch of 'smart' by augmenting existing or newly developed applications. AI services for areas including vision, speech, language, knowledge and predictive analytics are routinely available as microservices, penetrating any technology business stream and avoiding the alien realms of deep learning, neural networks, reinforcement learning and computer linguistics. And to ensure a steady flow, easy-to-use, conversational interfaces can be added – such as voice assistants or bots – to make application services that much easier and accessible to users.
- Just as the sea continuously laps against the shore, tide upon tide, new applications are constantly built and released – DevOps-style. As soon as one ebbs, another one forms. Quick iterations are jointly developed by business and IT teams, leveraging microservices, APIs, software containers, serverless computing and radically automated, high-productivity tools. Built-in analytics, cognitive AI capabilities and smart contracts further add to both the corporate IQ and the trust balance of the enterprise.
- It is the unleashed application that works in the most fluent and seamless way, harnessing power and seemingly anticipating the intentions of its users almost before they are expressed. Whatever the forecast, the application landscape needs to help us weather the storm, adjusting quickly and responding to change, to find those calmer waters ahead.

Kondo MY **Portfolio**

Tidying up the applications portfolio in a systematic, decisive way to open the floodgates of innovation, hyper-agility and the next generation of powerful applications

Discarding the burden of an existing traditional applications landscape will bring clearer waters for any IT fleet. But to actually getting rid of old, inflexible and costly applications requires the mindset of a specialized 'tidying up' guru. First of all, it's a matter of commitment, aligning the need for decluttering throughout the organization and envisioning the benefits of what an adjusted and more flexible applications portfolio can bring. In essence, tidying up is about being rid of applications that no longer provide value whilst adding new services that anticipate change from the onset. Architecture and new platform technologies hold the key to systematically clean up – in the right order – and move forward to the desired state; a simpler and more agile portfolio of applications services, prepped for the future.

Thilo Hermann
Expert in Residence

WHAT

- Existing applications portfolios often commit large amounts of budget, resources and capabilities, contrary to business value. They may also be challenged with a substantial technical 'debt' of outdated or over-customized technology and architecture.
- Few organizations master the art of systematic application rationalization. Many IT experts know how to build new systems, few know how to decommission them.
- There needs to be an end-to-end approach of replacing (or retiring) both traditional and mission-critical applications, including:
  - Alignment of stakeholders to agree the need for application rationalization.
  - The selection of a new platform and definition of the migration strategy.
  - An understanding of the metrics and migration scenarios, using tools like eAPM.
  - The leverage of the existing treasury of data as part of the modernization.

USE

- An automotive OEM in Germany re-platformed its application portfolio, resulting in a reduced time to market - from two releases a year to monthly deployments. It also reduced the license and infrastructure cost by more than €500k per year.
- An OEM within the automotive industry in Germany is using BlueAge to migrate an existing mainframe application based on COBOL to Java. As part of the migration, the application itself is re-architectured with new APIs introduced.
- 58% of the insurance sector's digital masters have migrated their legacy IT systems to cloud-based applications, compared to an average of 35% in non-financial services organizations. (Capgemini Research Institute)
- GE Healthcare's own 'GE Infrastructure Exchange' (GEIX) is a remotely managed OpenStack private cloud, which enabled GE to move 530 legacy apps to the cloud in under two years, delivering a 49% footprint reduction and annual savings of over €30-million.

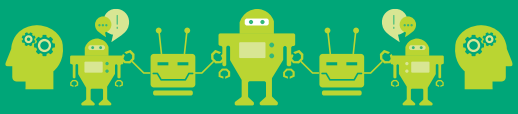
IMPACT

- Unification across the enterprise, enabling new business functionality and models,
- Lower cost of software development and maintenance combined with higher software quality and reduced time to market,
- Faster development and change cycles due to the slimming down and reduction in complexity of the entire application portfolio,
- Simpler operation, faster error identification and root cause analysis, due to reduced overall complexity,
- Space for innovation, both in terms of budget and available skills.

TECH

- Re-platforming: Bluage, LzLabs Software Defined Mainframe, Capgemini eAPM, Capgemini Cloud Migration Factory
- Agility: SAFe, LESS (Large Scale Scrum)
- DevOps: CP Innovate (e.g. DevOps-PaaS, API Management)

Bot is the **New App**



Providing compelling, conversational, frictionless access to application services, with the user's intentions at the core – not the application

Say what? Every day, new and exciting applications spring up, looking nothing like their more traditional counterparts. Often you can't even see them at all. Building on powerful artificial intelligence (AI), it's just a matter of stating an intent in natural language and an application service will be activated. Application bots may involve spoken dialogue or messages and emoticons. Like a wave clearing a path through complexity, bots will seriously diminish the number of applications on desktops and mobile devices. Or at least, they will shield the user from their intricate interfaces. Close your portholes – the bots are here..

Smitha Gopalaiah
Expert in Residence

WHAT

- Bots have endless applications, from answering simple queries, to helping book tickets for events or shows, finding products, checking inventories, generating sales leads, organizing aid in the health care industry, and the list goes on.
- Used from any device such as the desktop, smartphone, car or a dedicated device such as Amazon's Alexa, virtual assistants apply artificial intelligence to recognize and produce natural language, acting as a front end to application services.
- Messaging apps apply technology to recognize and produce text and even emoticons, which can be integrated with existing chat platforms or built as stand-alone applications.
- Bots can provide a more natural means to automate workflows; Google Duplex can make appointments and Siri suggests workflows based on phone usage. Enterprise software providers will soon follow with similar functionality.

USE

- During the December holiday season, Swedish retailer H&M's voice capability allowed consumers to browse their entire gift catalog and order products using voice assistants.
- The customers of German-based online retailer, OTTO can interact with their voice assistants on a range of queries, from sales to recent campaigns.
- Bank of America's virtual assistant, Erica reached one-million users in three months, offering voice, chat, and gesture capabilities. Consumers predominantly use it to browse their spending history and obtain account balances, numbers and bill payment details.
- The OneRemission chatbot has been specifically designed for cancer patients by providing a comprehensive list of diets, exercises and post-cancer practices. If they require a specialist, it also allows users to consult with an online oncologist 24/7.

IMPACT

- Over the next three years, 70% of consumers on average will replace their visits to a store, bank or dealer with voice assistants. (Capgemini Research institute)
- Bots are more popular for use in Retail Banking and Insurance, Consumer Products and Retail sectors, followed closely by the Automobile industry. (Capgemini Research institute)
- In the next two years alone, the uptake of voice technology is expected to increase by more than 15% for each key activity within the consumer retail journey. (Capgemini Research institute)

TECH

- Customer Service interaction: IPSoft Amelia, Capgemini Odigo, Genesys, ServiceNow
- Voice assistant platforms: Microsoft Cortana, Apple Siri, Amazon Alexa, Google Duplex and Assistant, Alibaba's AliGenie
- Voice assistant devices: Amazon Echo, Google Home, Apple HomePod, Alibaba Tmall Genie
- Text assistant platforms: WeChat Open Platform, Microsoft Bot Framework, Facebook Messenger Platform; Uipath Druid;
- Conversational design: Conversational Academy

When Code **Goes Low...**

Low-code and no-code platforms make building next-generation application services a high-productivity matter, for both IT and business specialists

When code goes low, business gets on a high! You may be blessed with brilliant ideas for killer application services, but you'll need to deliver them blazingly fast and with the right quality. After all, classic software delivery based on manual work and complex programming languages will only get you so far. It is now easier than ever to construct applications without huge coding efforts. The secret is in powerful, AI-enabled tools that leverage API catalogs, prebuilt templates and automation to the fullest extent. And these tools are so powerful - yet easy to use, that they get the popular vote of both business and IT people

Desiree Fraser
Expert in Residence

WHAT

- Powerful low-code and no-code platforms are available for DIY, 'citizen' application development, although professional developers may be equally enthusiastic about their productivity and ease-of-use.
- Platforms depend on the availability of robust, enterprise-scale API and web service catalogs (both internal and external), open data sets, and tested and proven template galleries.
- Sharing of best practices and collaboratively building on each other's solutions is a crucial success driver, as also evidenced by the 'Maker Culture'.
- AI will quickly assist in creating even more powerful DIY applications without any need for coding.

USE

- Arvesta chose OutSystems as a strategic platform to realize their ambition of becoming digital leaders: unlocking or modernizing legacy systems to boost productivity using new B2E applications and enhancing customer experiences through new B2C touchpoints.
- Microsoft significantly invested in their PowerPlatform becoming one of the leaders in low code as high-class developer's platform and leveraging the full Azure portfolio.
- Responding to Covid-19, Capgemini has proven itself to be liquid by building a fully configurable virtual onboarding platform using OutSystems with a single developer, in just one week.
- An American global Construction company strategically choose Mendix to replace their legacy systems and with the ambition to modernize over 300 apps.
- In a mission to accelerate time to market and bring business and IT closer together, the Dutch Police chose Betty Blocks as their strategic low code platform. Steve Hanenkroot of the Dutch Police stated, "With just the basics, you can go up to ten times faster and with lower IT costs. Anything is possible. It's like building a car in a factory, where standard components and robots help you build the best quality in the fastest way, instead of building the car in your own garage with a screwdriver."

IMPACT

- Increased application development productivity, on both the business and IT sides.
- Increase organization agility through significantly lowered time to market for new business applications.
- A cohesive alignment between IT and business through personally involved and committed 'citizen' application developers, and the open, digital platforms that IT supplies to help these citizens along.
- More innovative and higher-quality business-facing applications.
- Enterprise robustness combines with agile solutions.

TECH

- High productivity development platforms: Mendix, OutSystems, Microsoft PowerPlatform, Salesforce Lightning Platform, Betty Blocks, Appian, AppGyver, If This Then That, Thinkwise, Quantum, Pega

API Economy

Manage APIs as the core asset that makes both the internal organization and the outside world fully benefit from your application services – and vice versa

May the best API win. Unleash the power of your applications portfolio through easy-to-use, standardized interfaces to application services with tailored content. This will allow both the business and IT sides to quickly build flexible solutions that feel like their own, even if they are not. And by exposing your carefully managed API catalog to the outside world, it doesn't just open up your business in new ways to customers and partners, it might also allow a tide of innovative solutions you never envisioned yourself. Come to think of it, you may want to intimately know and use the APIs of others as well. Your Technology Business breakthrough may be just one API away.

Leon Smiers
Expert in Residence

WHAT

- An application programming interface (API) provides standardized, open access to an application service or data set, decoupled from the actual user interface of the application.
- APIs provide the building blocks for developers to compose and enrich their application, leveraging data from multiple sources. As more and more companies open their data sources using APIs, the need to build bespoke services is reduced.
- APIs can be managed as a product through API management platforms, incorporating scalability, quality, and monitoring of actual use.
- APIs can be built on top of existing applications in order to provide more flexible access; new applications typically come by default with a set of accompanying APIs.
- With the many datasets available within an organization – and even external sources – APIs can be leveraged to deliver data, insights and algorithms.

USE

- To maintain their competitiveness in the market, fast food companies plug into the rapidly growing delivery services, such as Grubhub, Deliveroo and Uber Eats.
- The New Zealand Post provides a special developer resource center that enables its customers and partners to implement digital solutions by integrating their applications with the New Zealand Post's APIs.
- To change the traveling habits of Dutch commuters, Dutch rail exposed their ticket services to other companies, such as lease companies and tour operators, enabling them to enrich their tickets with insurance and travel advice offerings.
- Liberty Mutual recently launched a developers' portal called SolariaLabs, to create driving apps using the company's proprietary insurance data, to provide customers with recommendations on the safest driving routes and places to park in major US cities. (Capgemini Research Institute)

IMPACT

- Simplification of the application portfolio, as well as better and more flexible access to existing and new application services for both business and IT.
- Monetizing and enriching application services through the publication of APIs to customers, partners and external developers.
- Leveraging external API catalogs for ready-to-use application functionality, AI capabilities and very specific IT services.
- Connecting the enterprise to be able to interact with external parties, partners and market in order to trade and share.
- Delivering tailored advice to partners and customers increasing competitiveness.

TECH

- Dedicated API management platforms: Mulesoft, Dell Boomi, Microsoft Azure API Management, Oracle API Platform, WSO2, Kong, Tyk, Apigee, IBM API Connect, API management, AWS API Gateway
- API management open standards: The Open API Initiative
- API marketplaces: Programmable Web, AWS Marketplace

APPS ♥ AI

Systematically infusing new and existing applications with AI capabilities, making them smarter, autonomous, valuable, with a positive impact on society and the environment

AI sometimes seems to be the domain of mad data scientists and highly specialized, secretly initiated experts. But actually - through simple APIs and webservices - every application can benefit from touches of smart, without any black magic involved. AI disrupts every industry with intelligent platforms and solutions. Surf the applications portfolio wave to find the application moments that would profit the most from added AI capabilities such as image recognition, natural language understanding, automated decisions, predictive analytics and recommendations. Use benefits logic to prioritize the cases and leverage a catalog of ready-to-implement AI services. Application users will love all that extra intelligence.

Rajashree Das
Expert in Residence

WHAT

- Many AI and cognitive capabilities can be easily accessed through web services and APIs, including image and voice recognition, intelligent automation, natural language processing, conversational systems (bots), plus predictive and prescriptive analytics.
- Often, these capabilities come with pre-trained models, eradicating the need to acquire training data and build algorithmic models.
- Applications become 'smarter' and 'ultra-speedy', creating more value for users with enhanced performance and speed.
- To effectively incorporate AI, new and existing applications portfolios need to be systematically reviewed to find added value opportunities, while considering benefits.
- Metrics-based portfolio management tools such as eAPM can enable creating this 'Apps ♥ AI' shortlist.

USE

- Capgemini's own solution, Project FARM, an intelligent data platform to resolve global food shortages. Global demand for food is anticipated to increase by 60% by 2050
- Microsoft's Anomaly Detector embeds anomaly detection into apps, to quickly identify potential problems, select the best-fitting detection model and ensure accuracy.
- IBM Watson Tone Analyzer can be added to customer service applications, responding to customers appropriately and at scale, detecting if they are satisfied or frustrated.
- Google's Cloud Vision Product Search can be added to any commercial website, allowing users to upload an image of what they want, for it to match products in their catalog.
- Tesco and Monoprix are leveraging conversational commerce systems such as Alexa and Google Home together with machine learning capabilities. (Capgemini Research Institute)
- Capgemini's Intelligent Automation Platform (CIAP), enabling effective IT, applications services, and business operations delivery to provide intelligent automation at its full potential for businesses to reap maximum value across the entire operation.

IMPACT

- Extend the life span of existing applications by adding 'smart' functionality.
- Increase adaptability of applications, and automate manual activities that originally required cognitive, 'human' capabilities.
- Equip developers with a toolset to build powerful cognitive capabilities, without the need for a deep background in data science and analytics.
- Create a more compelling, personalized user experience in both business and consumer-oriented applications and mobile apps.

TECH

- Toolkits and platforms: Capgemini PerformAI, Microsoft Cognitive Services, IBM Watson APIs, AWS AI Services, Pega Real-Time AI, Rainbird, Google Cloud AI Building Blocks, TensorFlow, PyTorch, RapidMiner, Keras

THRIVING ON DATA

Thriving on Data

No, Data is not the New Oil. If only because it has undisputedly become one of the biggest, content-free clichés of the industry, right next to Change is the Only Constant. In fact, if an enterprise has not already committed to being Data-powered by now, it may already be too late; unless it is in one of these rare, arcane industries in which data simply doesn't matter. Just like every Business has become a Technology Business – with an uncalled for, yet quite convincing tailwind from the pandemic crisis – so should every Enterprise now be a Data-powered Enterprise. Consider the facts. Data - combined with the raw, elastic capabilities of the cloud - powers resilience, performance, innovation and renaissance-style breakthroughs in every business play.

Ron Tolido
Expert in Residence

This is the case when putting the Customer First, anticipating the whimsical preferences of the consumer market in real-time through aggregated data from internal and external sources and predictive analytics. Or it is shaping seamless, highly personalized online user experiences, enabled by conversational, intent-driven AI.

It surely is the driving force behind the notion of Intelligent Industry, in which smart products, devices and vehicles capture live sensor data at the edge of the corporate IT landscape, turned into direct responses by continuously learning AI inference models.

Also, the same combination of sensor-style, real-time capture and analysis of data with intelligent process automation capabilities is impacting the more mundane, core Enterprise Management processes that most organizations have, such as HRM, F&A, Procurement, Supply Chain, and IT.

Data only delivers on its potential to the busines when it is shared with others. Data literally must become the product, with committed owners, dedicated producers and committed consumers. Contracts between the involved players should harness the value, conditions and quality of the data products. The fluent marketplace that results from it always finds new ways to thrive – even when it is threatened unexpectedly or moves toward unexplored territories.

It is illustrated by the 5 Thriving in Data trends:

- **Crazy Data Train** makes a plea to treat data like any other key corporate asset - by deeply understanding its internal and external sources, and mastering ways to leverage it as a high-value product.
- **Power to the People** promotes bringing data right in the middle of business, to activate it where it is born and used, bringing true responsiveness.
- **Data Apart Together** states that a federative, 'mesh' network of committed data owners, producers and consumers – enabled by a rock-solid enterprise-scale platform – is the best reflection of business dynamics.
- **How Deep Is Your Math** sees data activated through more and more powerful analytics and AI, presenting the enterprises with an increasing portfolio of algorithmic and learning tools to address any challenge or opportunity popping up.
- **Good tAImes** does an appeal to put trust, AI ethics and the quality of data always before anything else – and then to home in on sharing and activating data to fulfill the company purpose, building sustainable and inclusive futures.

Crazy
Data Train

Data is the strategic asset – and it needs to be managed as such, by deeply understanding its sources and destinations, and mastering all ways of the enterprise to activate at the very heart of the business

Enterprises jump on the bandwagon of data as the key to better engage their customers, to intelligently automate their core business processes and to design and manufacture smart products. For that, data needs to be activated at the center of every crucial business activity. It's crucial to understand how to get it; not only from internal, but also from external sources. It requires a sharp 'procurement' market eye to get the right data. It needs an R&D-like vision to design how it will produce value. And it taps into the mindset of marketing to envision how to monetize data, in- and outside the enterprise. If data can be put on the corporate balance sheet, it will trigger even the most executive perspectives. Above all, it's a matter of deploying organizational data enablers and behaviors - leaving nobody behind for the ride. All aboard!

Anne-Laure Thieullent
Expert in Residence

WHAT

- Any organization looking to activate data in their business first needs to create an inventory of data assets across the company, as well as data assets leveraged from outside.
- Data from external marketplaces, including brokers of open data and industry consortia – combined with own data – can create even more valuable insights.
- Suppliers of (labelled) training data provides crucial input for machine learning and analytical purposes, especially when the organization does not hold such data itself.
- New ways of accessing training data outside the organization – such as Federated Learning and Data Collaboration - open up previously unexplored data sources.
- Simulated environments and reinforcement learning can provide crucial (synthetic) training data in cases where real-life data is insufficient or unavailable.
- Data becomes a corporate asset when it provides tangible economic benefits and adds to the corporate purpose; its economic value should be on the corporate balance sheet..

USE

- The MELLODDY consortium aims to enhance analytics on the data of 10 pharmaceutical companies, without exposing proprietary information.
- Skywise is the first-of-its-kind open data platform, developed by Airbus for collaboration with the aviation industry ecosystem.
- Continental developed an AI-based virtual simulation program, which generates 5,000 miles of vehicle test data per hour, which otherwise would have taken over 20 days.
- 890 by Capgemini offers public, private and community marketplaces for curated datasets, providing companies 'as-a-service' access to data from external and internal sources.
- The EC Support Center for Data Sharing enables member states to share data securely with other other governments and organizations, whilst respecting intellectual property and privacy.

IMPACT

- Activating data at the heart of the business to serve key corporate objectives and purposes.
- Improving effectiveness and value-creation of existing business intelligence and analytics by adding external data.
- Shortened time to value for new insights, analytics or AI models by leveraging more diversely sourced training data as well as pre-trained solutions.
- Monetization of own data and augmented data with partners, suppliers, clients, potentially even creating new business models.

TECH

- Federated learning tools: TensorFlow Federated (TFF), Xaynet, Owkin, OpenMined,
- Data exploration: Informatica, Alation Data Catalog, Apache Atlas, Waterline, Microsoft, Collibra
- Data creation: Mighty.ai, Appen, Scale AI labeled, Lionbridge, Mostly.ai, Sogeti ADA
- Data monetization: Dell Technologies, Intersec, Inzata, Sisense, Oracle

Power to **the People**

A lack of specialized skills, the need to activate the data as close to the business as possible - and some powerful AI and automation - are igniting the self- service data revolution

In a hyper-adaptive, data-powered organization, everybody needs to be a bit of data scientist and data engineer. The best insights are created in close proximity to the business and to do that that, data must be discovered, prepared, analyzed, and visualized right there. But real skills are rare; and secure, high-quality access to the right data is far from a given. AI and automation fuel a new category of easy-to-use, augmenting tools that provide the power of data to a much wider range of people. It offloads the pressure on central delivery while democratizing access to data and algorithms. Data for all, right on.

Mukesh Jain
Expert in Residence

WHAT

- Within any Technology Business, insights need to be created and used in real-time, in the nearest proximity of the business, possible through DIY tools.
- This requires an automated, AI-augmented, factory-style data pipeline to ingest, select, transform and prepare data – making the right data available with a minimum of specialized human intervention.
- Creating business intelligence, analytics, or AI – also benefits from automation and AI-augmentation (e.g. Automated Machine Learning - 'AutoML) putting data power in the hands of more users, even if they lack the deeply specialized skills typically needed.
- Tiny Machine Learning (TinyML) moves towards the computing edge, where even the smallest devices can be equipped with advanced, easy to manage AI algorithms.
- Augmented Intelligence and Knowledge systems – equipped with cognitive capabilities – provide business users with highly personalized, timely external and internal insights.

USE

- A European bank standardized and automated their client's asset allocation insights on Microsoft PowerBI, making them available as self-service to both investment advisors and their clients. With clients being able to view and manipulate the data, it drove higher engagement and client satisfaction.
- A manufacturing company empowered its business users with self-service procurement insights, demand sensing and supplier risk assessment solutions. The business users were provided with the power to connect to the right data sources using a data exchange, create insights and scenarios themselves, and drive their inventory management more successfully.
- A bank's marketing department identified a surprisingly interesting wealth management segment using a plain AutoML studio, with other business users built algorithmic models that reduced loan defaults in microfinance by 5%.

IMPACT

- Cost effective production of BI and analytics results, reducing manual effort and increasing quality.
- Better and faster access for the business to more relevant data from various internal and increasingly, also key external sources.
- Speedier availability of new insights to the business, improving responsiveness and adaptability.
- Increasing cultural and practical awareness on the business side of the potential for turning data into insights, algorithms and AI.
- Dealing with the scarcity of specialized resources in data engineering and data science.
- Freeing up time for specialized data scientists and data engineers to work more on the highest priority models and business outcomes.

TECH

- Data Exchange: AWS, Snowflake, DAWEX
- Self-service tools: AWS QuickSignt, Tableau, Microsoft Power BI, Qlik, SAS Visual Analytics, Dataiku, Saagie, Google, TIBCO
- Augmented Information Intelligence: EdgeFlow, HIPSTO
- AutoML: DataRobot, Google, H2O, IBM Watson Studio AutoAI, Microsoft AutoML research

Good tAImes

As the currents of business become less predictable and erratic AI solutions require to become transparent and clear as water, executives and customers steer away from dark places and towards AI that illuminates the company purpose

With all of us increasingly relying on data and algorithms in both personal and business lives, it's not that simple to just leave our cares behind. Consumers are much more open to products and services if they trust that their privacy is respected, and security is guaranteed. Workers will embrace support from AI earlier when its mechanisms are transparent, its training data is unbiased, and it augments them in their daily work. Regulators will demand AI solutions that can be audited and explained. And all of society expects ethical AI, driven by compelling purposes for positive futures. Although there may be still smoke on the water of AI, it's wise to do AI good and do AI for a good, sustainable future.

Fabian Schladitz

Expert in Residence

WHAT

- With data and AI at the heart of business initiatives, organizations find themselves under increasing scrutiny to not only comply with data protection regulations such as GDPR, but also to ensure proper, ethical use of data and algorithms.
- AI systems need to be transparent and understandable. Research in explainable AI (XAI) creates approaches and technology to achieve this.
- (AI) Technology helps to build ethical AI solutions in areas such as bias detection, transparency, 'explainability', auditability and continuous monitoring of accuracy.
- Besides the dark currents of ethical questions, AI can wash away the challenges in societal areas such as climate change, digital inclusion, health improvement and sustainable food production. It becomes pivotal to delivering on the corporate 'raison d'être'.

USE

- Scotiabank has set a vision for its interactive AI systems to improve outcomes for customers, society and the bank. The bank also monitors systems for unacceptable outcomes to ensure there is accountability for any mistakes, misuse, or unfair results.
- An app supports the Public Assistance-Hospitals of Paris (AP-HP) in France, by allowing remote monitoring of patients with or suspected of having Covid-19.
- AI and face recognition technology helps to find missing children in India.
- A solution using numerous data sources and machine learning helps farmers better plan their harvesting seasons as per changing climate patterns in the Africa.

IMPACT

- If consumers believe a business offers ethical AI interactions, over half said they would place higher trust in it, share positive experiences, be more loyal and purchase more.
- Organizations whose AI systems consumers perceive as interacting ethically, enjoy a 44-point Net Promoter Score (NPS®) advantage.
- Nearly two in five consumers would complain to the company and demand an explanation if they experienced an unethical interaction. In the worst case, a third would stop interacting with that company altogether.
- AI for responsible, 'positive' purposes is not only an additional way to boost the ethical use of AI, it also provides an engaging and safe training ground for getting hands-on AI experience and lending purpose for data enthusiasts.

TECH

- Model management: IBM, LIME and SHAP, Google, What-if, Datatron, AI Explainability 360, AI Fairness 360, RoundSqr, Fiddler, Kyndi, Craft AI, Chatterbox Labs, Darwin AI, Flowcast, Skater, lit, CertiFai , ELI5, Alibi, Lucid, Yellowbrick, MLxtend, DeepLIFT, H2O 3, DALEX, Aequitas
- Industry standards: European Commission, DARPA's DARPA

Data Apart **Together**

If the organization is distributed and data is everywhere in- and outdoors, it is best to manage data in a federative way - balancing local ownership and a central platform drive

The single source of truth in corporate data is like the Holy Grail; great to pursue yet destined not to be found. Many different sources, uses, and perspectives of data typically exist both inside and outside the organization. And it's changing overnight. Why not fully embrace that diversity and create a federated business take on data? AI-enabled tools help to keep a grip on a variety of data sources, data stores, definitions and consumption patterns, wherever they are and whoever owns them. It empowers local units to mind their own business with data yet, be a collaborative contributor to organizational integration, robustness and direction. The best of both worlds, really.

Fiona Critchley
Expert in Residence

WHAT

- The increasing need to collaborate with data in a continuously changing network of both internally and external parties, calls for managing and sharing data in a federative way.
- A centrally managed, 'single source of truth' datastore, does not cater for a complex (cross-)enterprise situation with diverse stakeholders, unaligned definitions and viewpoints, and different ways of storing and accessing data.
- The fitting approach to data management is about actively sharing trusted, ethically managed and secure data; stimulating businesses to truly 'own' their data and collaborate with internal and external partners.
- For this, data needs to be discoverable – enabled by business glossaries, data catalogs, metadata management, graph navigation and data lineage tooling. It also needs to be addressable, with microservices and API's creating a common access interface.
- The data platform infrastructure that is needed to enable this needs to leverage data pipeline and stream processing, data mesh and data lakehouse architectural design principles, data virtualization and other integration technologies.

USE

- A leader in healthcare and life science wanted to open-up distributed data for self-service analytics, creating a data catalog that automatically inventoried every field of data from several data lakes and data stores to maximize the business analysts' time.
- A global beauty products company spent too much time finding and aligning its data, with product information residing in multiple systems and different definitions of standards across regions. Through the implementation of federated MDM, it reestablished its handle on mastering complexity, freeing up valuable time.
- Europe's biggest online fashion retailer, Zalando realized that accessibility and availability of data at scale can only be guaranteed when responsibilities are moved to those who pick up the data and have domain knowledge – the data owners. The applied Data Mesh paradigm thus promotes the concept of federated Data Products..

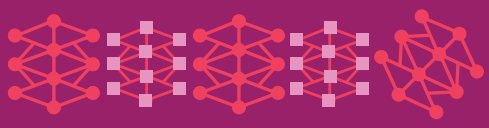
IMPACT

- Access and ownership of data as close as possible to the business brings responsiveness and agility, without giving up on enterprise-scale orchestration and purposes.
- Better inventory of what data assets are available within the organization means increased leverage of data for value creation.
- Enabling owners and users of internal and external data stores to collaborate more effectively, provides better business outcomes for all involved through shared data.
- Quick results and time to market without lengthy, often unrealistic and overly complex unification and standardization efforts.

TECH

- Master data management: IBM, Informatica, Talend, SAP, Oracle, Microsoft, SAS
- Data exploration: Informatica, Apache, Waterline, Microsoft, Collibra, Alation, Alteryx
- Data virtualization: Tibco, Informatica, Denodo, Actifio Sky, RedHat, Oracle, Microsoft, SAP
- Data integration: Microsoft Synapse, IBM InfoSphere, Informatica, SAP, SAS, Dell Boomi, SnowFlake, Trifacta

How Deep is **Your Math**



Challenge everything you've tried so far with analytics and algorithms, AI brings alternative, awesome ways to solve problems

Much of the current love for AI arguably comes from deep learning on neural networks. These are essentially brute force, pattern recognition machines that – if provided with enough training data – can go where more traditional data science (often based on statistics and mathematics) stops. Deep learning can be combined with other technology-enabled approaches, such as reinforcement learning, in order to provide even more raw, unmatched problem-solving power. Its simplicity is appealing, as it functions as a black box that simply needs lots of training data to become accurate. But as we are living in a world of tools, more than ever it is also a matter of finding the right balance between human and machine powers.

Padmashree Shagrithaya
Expert in Residence

WHAT

- Many current advances in AI are due to machine learning models on neural networks, detecting and classifying features through multiple layers in raw input.
- With abundant training data as an input, deep learning neural networks can recognize patterns much more effectively than traditional data science approaches
- Advances in the ability to collect, store and access training data, plus the emergence of powerful graphical processing units (GPUs) have been instrumental to success.
- Reinforcement learning uses an action/reward approach to learn from interactions. Combined with deep learning, it creates even more powerful AI applications in areas such as robotics, scheduling and gaming.

USE

- Using AWS Recognition, an AI system was built for retailers to analyse real-time footage for 'foot fall monitoring' – the movement of individuals in a store – to improve customer engagement and increase sales. The technology can be used in many situations such as security, social distance monitoring, facial analysis, field game tracking, emotion detection, inventory management and even customer onboarding on a cruise ship.
- Google's 'precipitation nowcasting' research project uses standard deep leaning image recognition models, making highly localized 'physics-free' precipitation predictions that apply to the immediate future. The machine learning approach is cheap, allowing almost instantaneous forecasts and in the native high resolution of the input data.
- Visa developed an advanced AI system to help manage transactions when service disruptions occur. Using deep learning to analyze past transactions, it enables approving or declining transactions if systems go offline, helping to prevent fraud.

IMPACT

- Solving problems that were deemed impossible to solve – or insufficiently successful – with more classic data science approaches.
- Creating powerful, complex autonomous systems, occasionally even with a lack of sufficient volumes of training data.
- Building next generation predictive and prescriptive analytics that go beyond human (or statistics-based) approaches in their capability to detect patterns in seemingly unmanageable volumes of unrelated data.

TECH

- Deep learning / neural networks: TensorFlow, Microsoft Cognitive Toolkit, Theano, MXNet, Keras, Chainer, PyTorch, Gluon, Horovod, AWS Deep Learning, Caffe, Deeplearning4j, PlaidML, OpenAI GPT-3
- Reinforcement learning: AWS DeepRacer, Facebook Horizon, Gym on OpenAI, Microsoft Project Malmo, Google Dopamine, RLLib via Ray Project, Tensorforce, Reinforcement Learning Coach by Intel, MAgent, Tensorflow Agents, SLM Lab, DeeR
- AI infrastructure accelerators: NVIDIA deep learning, AWS Deep Learning AMIs, Google Cloud TPU, Intel AI and Neural Compute Stick, Apple Neural Engine, Qualcomm Cloud AI100, IBM Watson Machine Learning Accelerator, Inference Engine by FWDNXT, ALVEO

PROCESS ON **THE FLY**

PROCESS ON THE FLY

Process on the Fly

As we all know, a high IQ is not always a recipe for crushing success. In the end, it's all about execution. Corporate speed depends on the ability to turn insights into action, to quickly respond to events, to overcome business silos, to seamlessly ride the waves and to rapidly change our ways if circumstances so dictate. This is where process management needs to deliver; to be fluid, agile, reactive and yet proactive, and able to self-adapt to weather every storm. Having consistently caught less of the sparkle than its complementary concept, Thriving on Data (ever heard of 'Big Process'?), breakthroughs with intelligent automation and a taste of autonomous decision-making have firmly planted 'Process on the Fly' center stage - underpinning the latest Technology Business experiences.

Manuel Sevilla
Expert in Residence

There are many different streams of process that can be supported and enabled by technology. Yet the increasing need for hyperscale and globalization is pushing organizations to a range of solutions that compete with cloud native actors playing the same game, but with different rules. Like an impending tsunami, the transformation may seem almost too big to comprehend, impacting everything in its path; organization, information technology, business models and of course processes. To steady the impact, it must be addressed process by process with each delivered step strengthening the foundation for its transformation, making the next evolution a more controllable tide. Human skills and mindset, technology solutions and processes, evolving together.

As a certified silo buster, it bridges gaps between corporate – or intercorporate – systems without intruding upon them. As a next generation solution builder, it's the glue that binds microservices and APIs together into something that we might have called 'applications' in the past. Combined with AI, cognitive systems and agile, it is making business processes more automated and intelligent, driving both decision-making and execution to boost corporate performance and create better places to work.

The move to this new perfectly paved process runway is for many no mean feat, as legacy and traditional applications implemented their own baked-in 'process way'. On top of this Commercial off the shelf (COTS) products were extensively 'customized', ensuring that every process implementation was unique and therefore almost impossible to effectively manage and change. But in a world where cloud native, 5G, big data, distributed ledger technologies, agile and microservices tears down the once well-defended boundaries, every Technology Business must ensure that their process landscape covers the entire technology business enterprise in a truly holistic, agile, secure and value for money way.

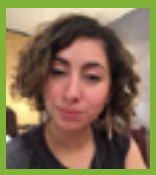
In their ultimate incarnations, processes become self-optimizing and touchless, as the silent companions to a frictionless enterprise.

Not exactly a Mayfly.

Processes 101

Creating a deep understanding of corporate processes as a prerequisite for simplification, standardization and – ultimately – intelligent automation and innovation

First things first. If a simplified, standardized process in a frictionless enterprise is the destination, then we must plan our best route. But we do not follow maps to buried treasure, and X never, ever marks the spot. The journey begins in understanding the process, enabling us to improve it continuously and with an agile state of mind. To do this well necessitates a fully defined process, taking careful and conformant steps to navigate the most frictionless waters, all the while dodging exceptions and bottlenecks that get in our way. The key lies in identifying improvement opportunities in both process and technology, removing any friction to allow us to sail the calmer route. And when we finally dock at our destination, the cycle begins again from the very first step. Slowly, cautiously, paying close attention to the everlasting quest for continuous improvement.



Elle Sanchez Cardenas
Expert in Residence

WHAT

- Use process mining technology to identify the most common variants (paths), bottlenecks, exceptions and violations in your process.
- Assess the business case of improvement opportunities by simulating the impact of implementation using digital twins.
- Automate activities and digitize end-to-end processes to improve the user experience and analyze performance with smart digital workflows.
- Perform continuous issue resolution and root cause analysis using data visualization and natural language generation.
- Accelerate transaction processing times using AI and ML to cognitively generate next best action recommendations (that can be fully automated in the future).

USE

- An American bottling company is using process mining to identify bottlenecks in the process, presenting positive financial impact and improvement opportunities.
- A consumer goods manufacturer uses digital workflows to improve the customer experience with user-friendly electronic forms, capturing approvals electronically (rather than via email) and automating actions on multiple systems.
- A British utilities company decided to focus on the exceptions that affected the highest volume of cases in their P2P process. Removing this friction from the process enhanced touchless processing, improved working capital and process standardization.
- By removing paper and email trails, a British catering retailer digitized end-to-end order to cash processes, enabling the reduction of costs worth 300K GBP from the business in just 12 months.

IMPACT

- Automation provides enhanced process efficiency and clear, defined processes.
- Enabling resources to focus on value-added activities such as business partnering or issue resolution, results in a reduction in manual effort of up to 80%.
- Improved process effectiveness through empowered compliance monitoring and tracking, proactively resolves issues as they happen.
- Improved processing times results in a material impact to customer service.

TECH

- Process Mining Tools: Celonis, Minit, Business Optix
- BPMN Software: Business Optix
- Digital workflow tools: Pipefy, Boomi Flow
- Natural Language generation: Arria
- RPA Software: UiPath, BluePrism, AutomationAnywhere

Rock
Robot Rock

Robotic Process Automation (RPA) delivers quick process benefits without elaborate and troublesome re-engineering

The robots are amongst us... though they sure don't look like robots. Rather, they emerge as powerful software solutions that target the mechanistic and repetitive processes of the human workforce, typically interacting with screens and applications. Robotic Process Automation looks at this interaction and aims to automate it as much as possible. The robots can even watch the human operators doing their daily job – and with the magic of machine learning – suddenly decide they can do it themselves, so create their own robots and start delivering. A simple, fluid and frictionless process of automation. So, while RPA may not involve shiny robots that walk around and carry your stuff – like R2-D2 – it will definitely speed up the flow of routine business activities. Robots work. Robots reproduce. Robots rock.

Manuel Sevilla
Expert in Residence

WHAT

- Robotic Process Automation (RPA) utilizes a software system to mimic the actions of a human worker interacting with the user interface of a computer system.
- This 'software robot' can be trained to work with the user interface just as a human would; virtually initiating actions, such as mouse clicks and keyboard inputs, interpreting display output and automating activities according to predefined rules.
- Robots can operate much faster when Artificial Intelligence (AI) is used in the discovery phase of business processes performed by humans.
- Additional RPA management software manages resource allocation, systems usage, and compliance.
- RPA solutions can carry out actions much faster - and more reliably - than their human counterparts, especially when cognitive certainty measures are included.

USE

- In just one month, a giant manufacturer has automatically generated dozens of robots by Kryon; tested and deployed to execute 78% of an end-to-end process.
- The Russian gas giant, Gazprom used RPA to automate verification of meter readings. In the first two weeks after the automation went live, an employee was able to validate about 130 invalid meter reads, saving 10 hours of work per employee.
- US-based electric and gas utility, Xcel Energy, uses data from sensors on wind turbines to develop high- resolution wind forecasts through predictive analytics and AI, resulting in a cost reduction to end consumers by $60 million.
- A large services organization automated its cash collection management process using RPA, reducing the manual work of 650 full time employees to 45 software robots, reducing the average handling time with an 85% cost reduction.

IMPACT

- The workforce creatively augments, enabling RPA robots to work alongside and cooperate with humans, delivering faster and more accurate services.
- Fueled with AI, fuzzy logic, machine learning, deep learning and NLP, RPAs can now execute and deliver the most complex processes, moving from limited automation to touchless end-to-end processes.
- Routine human tasks are executed more simply, quickly and reliably across a multitude of applications, saving time, money and resources.
- Due to its non-invasive nature, no applications need to be changed. Benefits are delivered quickly, effectively and without additional risk.

TECH

- RPA platforms: Automation Anywhere, Blueprism, UIpath, Nice, Pega, Appian
- AI solutions moving to the RPA world: Kryon, Workfusion, Abbyy

Pleased to Meet **You, Process**

Busting corporate silos by adding flexible process layers on top of them, rather than break solid, established structures

Ever wanted to break on through to the other side? Process-specific applications are creating seemingly impenetrable walls between processes. Data within these systems are stranded on their own splendid islands, unable to see each other, much less interact. Workarounds and exception processes only serve to push them further apart. Thankfully, new technologies avoid the need to replace process specific applications that you've customized and grown dependent on. Bridging the divide through data aggregation and cross-silo process flows not only break the walls towards enterprise-level unification, but also towards the outside world. Hi, other process. Hope you guessed my name.

Dave Laud
Expert in Residence

WHAT

- Data mining and analytics spanning the enterprise can identify opportunities previously unseen by disparate databases. Process mining has come of age and generates valuable insight into operational bottlenecks.
- Robotic Process Automation (RPA) enables the automated integration of multiple siloed applications without seemingly changing any of the affected systems. Not shy, these robots expose themselves as web services for ease of incorporation into other silo busting technologies.
- Business process management tools offer the capability to invoke various application services offered by different applications, as part of a modeled and managed process flow.
- Visibility and communication silos are increasingly removed through IPaaS solutions, integrating disparate systems and providing ease of access for multi-tower communication and workflow tools.

USE

- A global retailer increased its catalog revenue by 75%, through business intelligence analytics to break data silos, mine customer behavior, buying trends and payment patterns.
- A medical equipment manufacturer used RPA and cross-tower workflow to quickly and seamlessly integrate all processes and data of an acquired company, creating a unified view of both businesses, enabling a global view of credit risk and customer payment behavior, resulting in a 4-day reduction in overall DSO (Day Sales Outstanding).
- Boeing predicts when a part needs maintenance, repair, or replacement by utilizing artificial intelligence and machine learning, and deciphering usage patterns such as flight conditions, location, temperature, altitude, wind speed and direction.
- Dell Boomi is not only used to break silos by delivering integration, it stores on the cloud the metadata definition of any connector and is able to pre-generate new connectors and alert on potential mapping errors.

IMPACT

- Revenue probability is increased through deep analytics of unified data across disparate databases.
- Lifespans of aging or dysfunctional applications can be sustained without costly and risky applications management activities.
- Siloed applications are connected inside and outside the organization to create new, outside-in, end-to-end processes serving customers' and companies' digital needs.
- A high level of process flexibility and agility can be provided, without intruding on the affected application systems.

TECH

- Analytics and BI tools: SAP Analytics Cloud, Celonis, Minit, PowerBI, Qlik and Sisense
- API and web services management: Salesforce MuleSoft, Google Apigee, WSO2
- Robotic Process Automation: Automation Anywhere, Blue Prism, UiPath, Pega Robotic automation and workforce intelligence suite, NICE RPA, Kryon Systems
- Business Process Management: BusinessOptix, Dell Boomi, Oracle BPM, IBM Intelligent BPM, Pega BPM & Case Management, Appian

Can't **Touch This**

A process seamlessly adapting to its environment, optimizing itself without human intervention – is that even a process anymore?

When all you have is a hammer, everything looks like a nail. Optimizing processes by cutting out yet another inefficiency, leveraging yet another lean opportunity, only brings you so far. As the need for radical business agility continues to accelerate, there is limit to the classical process way of responding to complex events in real time. Driven by AI, fixed and inflexible processes can be replaced by powerful reasoning systems. These systems fluidly adjust to whatever situation occurs, anticipating next-best actions and resources needed on the fly. And as they continuously learn from what works and what doesn't, they increasingly become hands - and care - free. Stop! Hammer Time: the self-driving enterprise is coming.

Priya Ganesh
Expert in Residence

WHAT

- Hyperscale and touchless processes are a reality. It needs to reimagine the end-to-end process in a frictionless way with strong transformation and delivery capabilities.
- Business Rules Management System (BRMS) solutions externalize decision logic from applications, allowing both IT and business experts to define and manage decision logic. This logic can then be executed by Business Rule Engine (BRE) systems.
- Structured methodology adapts to the new ERP (Enterprise Resource Planning) roll out, creating bespoke levers to help organizations maximize value for money.
- Dynamic case management systems capture and process business events across process silos, providing end-to-end intelligence and optimized outcomes on a case-by-case basis.

USE

- A large consumer goods company used the power of DGEM with HANA environments to set up their finance back office support services around the world.
- Utilizing the AI-powered cash collection assistant, a large retail company improved their customer satisfaction ratings by reducing the dependency on their helpdesk agents to resolve vendor queries quickly.
- PayPal managed to reduce its fraud rate to just 0.32% of revenue using a sophisticated deep learning system that analyzes transactions in real time.
- A transport company used AI-based case management to streamline and automate the management of customer correspondence, leading to an 85% reduction in manual case preparation and handling.
- Soon, with automated drones and robotic warehouses, ordering to Amazon will simply activate an end-to-end touchless process that will deliver the order in an as-frictionless as possible way.

IMPACT

- Collaborative working across business units delivers detailed process mapping on the new HANA environment, ensuring the Target Operating Model fits the new HANA design roll out.
- Identifying platform optimization opportunities as part of transformation advances the benefits case from the tools landscape.
- Reducing the turnaround time for the collections process improves customer satisfaction.
- Impact process efficiencies and opportunities to setup, design and grow the client environment.
- Split-second responses to high-volume data streams and events in real time, particularly regarding the IoT (Internet of Things) and digital customer channels.

TECH

- Microservices and Cloud Native: Docker, Kubernetes, node.js, API, Devops, serverless on AWS, Azure or Google
- Business rules and decision management: Prowler.io, Drools Open Source, Oracle Policy Automation, Pega Customer Decision Hub
- Complex event processing: Amazon Kinesis, SAP Complex Event Processing, Tibco Business Events, Apache Flink, Esper
- Methodology: DGEM

Augmented Me

Adding AI to business operations speeds up decision-making and creates the symbiotic relationship that brings humans and AI closer together

"Taking the robot out of the human" is an established first step towards automation of work processes. But what if we bring AI into the equation? Mimicry is one element of mechanistic automation, but perhaps more important is the ability to augment human intelligence. This is apparent from AI's mastery of natural language and its understanding of audio, video, and images - but also from its ability to observe processes in their broader context, detecting complex patterns that humans cannot even see or absorb. The resulting symbiotic relationship between humans and AI is already changing the way we work, the way we organize ourselves, and ultimately, the way we do business and live our lives.

Lee Beardmore
Expert in Residence

WHAT

- Cognitive systems are mastering human conversation; processing natural language with interpretation and understanding of context, generating natural language where narratives are needed to describe raw data, or using computer vision to evaluate the quality of objects on a production line. These capabilities enhance existing processes by augmenting human work, replacing parts of it, or more frequently both.
- GPT-3 has unlocked the most advanced means of dealing with language to date, paving the way for AI to creatively produce narratives that we use to tell stories about the increasingly complex environment we operate in
- Cognitive algorithms are deriving how humans interact with applications so they can build automated routines to take over the work.
- Multi-agent systems work together to drive autonomous business operations. They focus on goal seeking, prediction and recommended courses of action to augment the human process. This liberates decision makers from the labour-intensive process of preparing recommendations.

USE

- A European mobile communications retailer leveraged cognitive technology to radically improve back office processes, leading to a 70% reduction in operating costs and up to an 80% improvement in operational efficiency.
- A trade finance organization digitized and categorized unstructured documentation and extracted relevant data with thousands of complex daily transactions, all managed by cognitive software and bots.
- PetSmart, a US-based specialty retailer, was able to save up to $12 million by using AI in fraud detection. The company implemented an AI/ML technology that aggregates millions of transactions and their outcomes.
- Capgemini Business Services uses intelligent document processing to automatically handle incoming structured and unstructured correspondence through a variety of digital channels, improving efficiency by over 50% on a volume of several million documents per year.

IMPACT

- Improved productivity and effectiveness through automated decision-making and the availability of real time, predictive insights.
- Human-like cognitive capabilities in end-to-end processes enhance the consumer experience.
- Mitigating the risks of attrition, aging workforce and dependencies in areas of specialized or scarce knowledge.
- Enabling new capabilities where AI infused processes deliver at a previously unimaginable speed, gradually approaching the era of autonomous processes and even the autonomous enterprise.

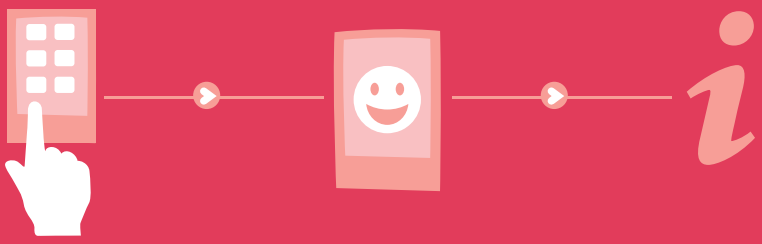
TECH

- Platforms: SecondMind, Aera, Microsoft, DataRobot, Celaton InStream, Artificial Solutions Teneo, WorkFusion, Loop AI Loop Q, Machinify, IBM Watson, Pega
- Adaptive learning: FortessIQ, Celonis, Abbyy Timeline

YOU
EXPERIENCE

YOU EXPERIENCE

You Experience



The user experience is at the heart of intimacy between an enterprise and its audience, whether they are customers, employees, or partners. And it is quickly moving different places, as preferences, players and positions change on a minute-by-minute basis. This is exacerbated by the accelerated move to online, 'no-touch' channels. Not an easy environment to build a solid understanding of what is driving the user it seems, let alone to develop a deep, mutual, emphatic relationship.

The good news? Real-time data, smart algorithms, intelligent automation, the Internet of Things and immersive technologies enable hyper-personalized, compelling 'you' user experiences, delivered through a widening range of channels. They drive these signature moments at which users feel their intentions are fully understood – without the need to express them elaborately, and even when the contact is only low-touch or even touchless.

Alexandre Embry
Expert in Residence

We have all experienced the accelerated shift to remote working and the blurring of work, home and social boundaries. Businesses that adopt immersive technologies will help employees become more autonomous and address social issues caused by the lack of direct personal presence.

At work, these technologies help employees to train and complete tasks autonomously. They reduce the need for physical collaboration, helping remote workers to feel physically closer than they really are.

The rise of machine-to-machine communication – notably in the area of Intelligent Industry - creates environments in which human involvement is optional or excluded. Extended reality technology – such as augmented reality, virtual reality, even mixed reality – combined with 'Digital Twins' will be crucial to humanizing these environments.

To connect to more consumers – especially this new generation, which is more culturally, environmentally and socio-economically aware – enterprises must provide exactly what these individuals want: seamless, personalized and engaging experiences that are accessible everywhere and at any time.

At home or in the street, wearables will offer an extension of AI services that are already deployed in smart homes and cities. This is a chance to help consumers and citizens interact with their environments, and data exploitation by pioneering organizations will drive the creation of brand-new services.

With technology becoming ultra-interactive and ultra-intuitive, understanding the nature of the real-time conversation and the user's emotional state paves the road to success. It is the quest for finding – or building – the platform where supply and demand will naturally come together, in which intentions hardly need to be expressed anymore, because they are already anticipated.

Coming all together, this provides the foundation for the ultimate 'you' user experience –one we don't perceive anymore. As futuristic as this sounds, this relies on technologies that are already on the shelf or reach mainstream soon.

Amid of all these technological breakthroughs and immersive experiences, it is key to harness the foundations of what makes us human: the ethical use of personal data and understanding the emotional curve of individuals involved - and the enterprise as a whole. Ultimately, to differentiate on the market and create the desired business impact, integrating inclusivity and having a frictionless mindset is critical when shaping the user journey.

Signature **Moments**

Using technology for better understanding of the customer's journey – creating the magical, standout moments that form a long-lasting connection with your brand

Want to live more in the moment? Don't forget the business perspective then, where it is highly rewarding to focus on the moments that provide seamless, satisfying, simple experiences to customers. These are standout moments in time of emotional connection - actually culminating to important outcomes for the customer and a creative, differentiating brand experience for the company. Empathy and deep understanding are key to interaction with the customer, and technologies as diverse as predictive analytics, bots and customer journey platforms can be instrumental to achieve this. Sing for the moment: signature moments make the difference that customers will remember.

Jessica Leitch
Expert in Residence

WHAT

- Brand loyalty diminishes as consumers switch from product to product in the search of something new and interesting at any given purchase opportunity. The key is to find signature moments, engaging with consumers to maintain that loyalty.
- Make your business unforgettable. Across the consumer journey every touch point should delight, but special moments intuitively link the customer to the brand, creating a standout emotional connection running far deeper than just the transactional level.
- The process of identifying, designing and delivering Signature Moments engages capabilities from customer research, customer strategy, data, design and technology.
- These are the moments in your business you're so proud of you'd be willing to personally sign them, to stake your reputation on them. Because here's the thing: you already are.

USE

- McDonald's created the first digital version of the Happy Meal gift to engage the younger digital generation, connecting a new customer to an established brand.
- As a response to the increasing home color market in the haircare industry, Garnier created its virtual try-on, allowing consumers to try a shade of hair color before committing to it.
- In a bid to counter competitors in the active wear market, Nike launched their 'Consumer Direct Offence', a strategy with 2x innovation, 2x speed and 2x direct connections with consumers, resulting in their digital business growing 38% of quarter 2 in 2020 alone.
- Starbucks, now a $100-billion-dollar company and owning 57% of the total café market in the US alone, attributes their success to investment in their employees, a world class customer experience and a focus on technology and innovation.

IMPACT

- Differentiation that drives preference, drives growth.
- Leverage brand loyalty and recognition through the viral, sharable nature of signature moments from the moment of unwrapping, through to a product's use and even disposal.
- Conversational interfaces enable brands to behave more in a human-like way; interacting, listening, empathizing and engaging, within a purely online or virtual channel.

TECH

- Customer experience management: Usermind, Highspot
- Real-time journey management tools: Kitewheel, Alterian
- Customer Platforms Technologies: Adobe Marketing Cloud, Salesforce Marketing Cloud and Service Cloud, SAP C/4 Hana, Pega, Usermind
- Customer Data Technologies: Salesforce Customer 360, Microsoft Dynamics 365 Customer Insights, Adobe Experience Platform, SAP C/4Hana Customer Data Cloud
- Customer Process Management: Microsoft Dynamics 365, Salesforce, Pega

Reality **Bytes**

An engaging mixed reality environment potentially makes for far more compelling, effective interactions between man and machine

Is this the real life? Well, look up to the skies and see. Almost any pocket-sized device can now create a completely 3D virtual (VR) or augmented (AR) reality, dramatically changing the way technology engages with us. Immersive technologies make you rethink the user experience from the ground up, mashing up real-world perspectives with unique, digital realities. This mixed blend brings radical change potential to areas as diverse as healthcare, training, maintenance, defense, R&D and collaboration. And this is even more so the case in times of social distancing and travel restrictions. Buckle up: bits are about to get real.

Gita Babaria
Expert in Residence

WHAT

- Simulated realities have become mainstream, available from high-end VR immersive environments to simple mobile phone apps.
- From basic cardboard virtual reality headsets to the high-tech Oculus Rift, displaying truly immersive, high-resolution environments; technology advances with smaller, more powerful devices, even in a contact lens.
- User experiences are becoming unfettered, natural, flowing, adapting to the environment enhancing the experience and productivity. Devices can talk to you, see you, hear you, anticipate your request and provide you contextual information from the digital world in the real world.
- Inclusion of haptic elements using integrated gloves, suits, or other touch devices and sensors enable users to 'feel' resistance and vibrations as they interact with virtual objects and experience the information realistically.

USE

- Doctors and Physicians now can treat and monitor patients who are miles away without compromising on the quality of care. The ability to engage with patients using extended Reality-based treatments are turning out to be lifesaving.
- A Mixed Reality visualization platform, developed by researchers at Imperial College London, projects multiple imaging modalities to assist intraoperative surgical guidance, enabling the surgeon to visualize subsurface anatomical structures in 3D with objects moved around the operating room using mid-air hand gestures.
- Enhanced, multi-sensory Virtual Reality trainings helps users learn practice and perfect tasks and operations that are critical like complex operations, combat training, firefighting, or even competitive sports.
- Four Seasons Resort Oahu and Sensync partnered to introduce The Vessel - a luxury virtual experience combining mixed reality innovation with advanced therapeutic technology to create a multi-sensory virtual reality wellness experience.

IMPACT

- Virtual merges with the physical world to create 'live' and unforgettable experiences for consumers, and valuable support and training tools for workers - interacting much more naturally and seamlessly with the systems around them.
- Regardless of physical location, or devices or the constraints of bulky equipment, users can access key data and applications.
- Creating hands-free and touch-free user experiences that are satisfying and effective to the user, yet comply to possible social distancing rules and travel restrictions

TECH

- Haptics / Sensory Interfaces: Tesla Suit, BeBop Sensors, Proglove, Vuzix
- Virtual reality: Oculus RiftS and Go, Samsung Gear VR, HTC VIVE, Sony PlayStation VR, Google Cardboard, Leap Motion, Amazon Sumerian, Unity
- Augmented reality: Layar , Microsoft HoloLens 2, Epson Moverio, DIOTA, Vuzix, Google ARCore, Apple ARKit, PTC Vuforia, Wikitude, Unity, Envisics
- Motion and image sensing, 3D scanning: Microsoft Kinect, Structure 3D scanning, Bridge

Own
Private Avatar

Creating an active, well-aligned marketplace of digital assistants that can act on behalf of customers, employees and organizational entities

Alexa, run my business! With our voice and bot assistants - whether they come from Amazon, Google, Microsoft, Samsung or Huawei - evermore entwined in our personal lives, it's time to get down to business. As consumers or employees, we want our digital intermediaries – our own, unique avatars – to represent our individual needs with brands, services and systems on our behalf. From a service or product provider's perspective, we want to understand, engage and interact with these avatars – in order to secure the right, signature moments with customers and employees alike. Even when we can't go out for shopping or do our work, avatars are there as our highly personal ambassador, butler and coach.

Gabi Ledesma
Expert in Residence

WHAT

- From personal digital assistants to purchase tendencies auto-replenishment and travel preferences, an entire layer of personal representation is out there, deciding and acting on our behalf.
- Where platforms like IFTTT already enable us to program routines to wake us up, turn on the lights and tell us the weather - we will group increasingly complex sets of routines and sequential functions and tasks.
- We are assigning personalities and human characters to these complex algorithms through avatars.
- These digital intermediaries living out in the online world are representing our individual needs with brands, services and systems on our behalf. Immersive design tools enable avatars to come to life in photorealistic ways.

USE

- Kroger is experimenting with digital assistants to enhance their store experience. Shoppers can build a shopping list using Kroger's Scan, Bag, and Go self-checkout app.
- H&M created a magic mirror that can communicate with you, provide fashion advice, and allow the scanning of QR codes for discounts and offerings.
- Los Angeles-based company, Lil Miquela created 'Brud', a digital influencer with 2 million followers to increase brand loyalty and awareness. They also partner with Calvin Klein and Prada for marketing campaigns.
- KFC worked with Generic Versatility to create the virtual version of Colonel Sanders. Unlike human influencers, virtual ones are always "camera-ready" and don't need to take time off.
- Gucci offers a version of its collection on their digital platform Genies. Users can create digital twins of themselves and outfit their avatars with the Gucci collection piece goods.

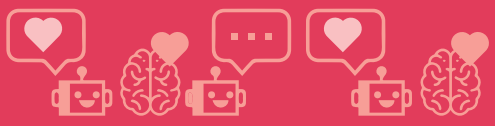
IMPACT

- Avatars provide unique opportunities for customers to personalize their shopping experience, even they have to comply to social distancing guidelines or travel restrictions.
- 'Reverse-auctioning' the demand and supply chain, by putting the customers' intentions and needs at the center using an avatar and having vendors 'bid' on it, promises more satisfying buying experiences for the customers and a wider target audience for vendors.
- Surprising sales swings will be a result of avatars reacting to cultural fads and trends rapidly and at scale on our behalf.
- Blatant and increased predictable loyalty will ensue as avatars commit our preferences to repeatable purchases, propensity to choose one brand over another, and seasonal habits.

TECH

- Digital Avatars: NEON, Facemoji, IBM avatar, Memory Mirror
- Chatbots, conversational and personal avatars: Alexa, Siri, Google Assistant, Bank of America's Erica, Sephora's personal assistant, Lemonade's Insurance sales agent, Slack bots in business, Facebook messenger, WeChat

I Feel **for You**



Boosting both the individual and corporate EQ, in order to create a more effective, meaningful and satisfying symbiosis between man and machine

Voice assistants and chatbots are becoming ever smarter. AI makes it possible to mimic our language and understand our intentions, sometimes to the point that we prefer interactions with technology – as it provides convenience, instant support, easy communication and is always available. AI also takes its place next to us at the workplace, augmenting us with powerful, intelligent capabilities and automation. But AI-based systems still lack two basic yet important qualities: empathy and emotional intelligence. It's a call to seriously boost our own EQ, both to make our systems and bots more sensitive to emotion, but also to simply complement AI with the unique capabilities that only man possess.

Claudia Crummenerl
Expert in Residence

WHAT

- Emotional intelligence (EI) is the ability to understand, manage and effectively express one's own feelings, as well as engage and navigate successfully with those of others.
- The shift of jobs and the need to constantly adapt require us to manage uncertainty and our teams' or own fears with greater awareness and care.
- As paradoxical as it may sound, advanced technology – such as AI, mixed reality, the Internet of Things and collaborative platforms – can help to sense and manage human emotions.

USE

- A global insurance company complemented its bi-annual pulse survey with an empathic, smart engagement bot to retain 78% at-risk- employees.
- Crédit Agricole Atlantique Vendée used the InsideBoard AI platform to help manage change, communicate with their employees and share their collective experiences during the pandemic crisis, now intending to fully integrate into their strategic plan.
- Affectiva Automotive AI provides an In-Cabin Sensing (ICS) solution that understands what is happening inside of a vehicle. Deep learning-based software uses in-vehicle cameras to measure in real time, the state of the cabin, and that of the driver and occupants in it — from complex and nuanced emotions and cognitive states, such as drowsiness and distraction, to occupancy, activity, object and child seat detection.
- Brain Power developed an Augmented Reality Smart-Glass-System empower children and adults with autism to teach themselves crucial social and cognitive skills.

IMPACT

- Ability to build more meaningful, emphatic and valuable relationship with customers, employees and partners, even in technology-dominated, virtual and online environments.
- Emotional intelligence, alongside 33 other important workplace skills, is the strongest predictor of performance, explaining a full 58% of success in all types of jobs.
- An individual's success rate at work depends on his/her EQ and IQ in a ratio of 80:20.
- Top benefits for organizations include enhanced productivity, high employee satisfaction, increased market share, and reduced attrition.
- Employee benefits include greater wellbeing, reduced fear of job loss, more openness to change, and the safeguarding of human jobs from machines.

TECH

- EI learning: MindTools, TalentSmart, Emotional Intelligence Masterclass, EI Experience, Sixseconds, Wysa, EQpower
- Recruiting: Eclipse, Workable
- Change: EI Experience , TeamEQ, Amber, Lead Honestly, InsideBoard
- Conversational systems: Microsoft (Cortana), Amazon (Alexa), Google Assistant, IBM Watson Assistant, Spot, Behavioral Signals, Kore.ai
- Language analysis: IBM Watson's Tone Analyzer, Amplify.ai, Bitext, Precire
- Voice analysis: audEERING, Intelligent Voice,
- Facial analysis: Affectiva, Kairos, and Microsoft Cognitive Services
- Emotions analysis IMotions, Nuance, Soul Machines

No **Friction**

Autonomous technology can create a user experience that is so fluent and adaptive, it's almost not experienced anymore

Still a fraction too much friction? The fully autonomous user experience is closer than you think. Tapping into the Internet of Things and omnipresent data, AI systems can be contextually aware of surrounding physical environments, as well as of the emotional states of the humans that are interacting in it. Intelligent, automated and individualized decisions and actions can remove bottlenecks and steps in a process – if indeed a process is still needed. The ultimate user experience is an almost psychic, 'no user experience'. It has systems, intelligence, data and devices that morph themselves proactively and fluently around the intentions of the user - no questions asked.

Andreas Sjostrom
Expert in Residence

WHAT

- Frictionless user experiences are in a way the pinnacle of breakthrough technologies coming together: omnipresent and shared data, Artificial Intelligence, Immersive technologies, the Internet of Things, and intelligent automation.
- As these systems become capable of carrying out complex tasks, anticipating our deepest intentions and understanding our context in real-time, it paves the way to greater freedom to pursue enhanced safety, less drudgery and more simplicity.
- Frictionless experiences seemingly appear to 'happen'. Technology combines individualized preferences, behaviors and propensity models at scale and speed, in micro real-time to simplify experiences.
- Trust by design is a foundation for No Friction user experiences, as personal data is the key to contextualization and personalization.

USE

- New immersive experiences combine physical and digital touchpoints, enabling value to be automatically delivered at the right time and right place, both digitally and physically.
- Autonomous and frictionless technology can simplify life management across eight major categories, including: career and business, finance and wealth, friends and family, fun, recreation and entertainment, health and fitness, love life, personal and spiritual.
- The dawn of autonomous finance is here, with new solutions automating everything from everyday banking to wealth management.
- Food manufacturers use IoT and micro-consumption to understand consumer preferences, reducing food waist and ensuring the right food is available in relation to regional tastes, made in a sustainable manner with organic ingredients, delivered via drones that replenish when you need it, aligned to your personal taste and values.

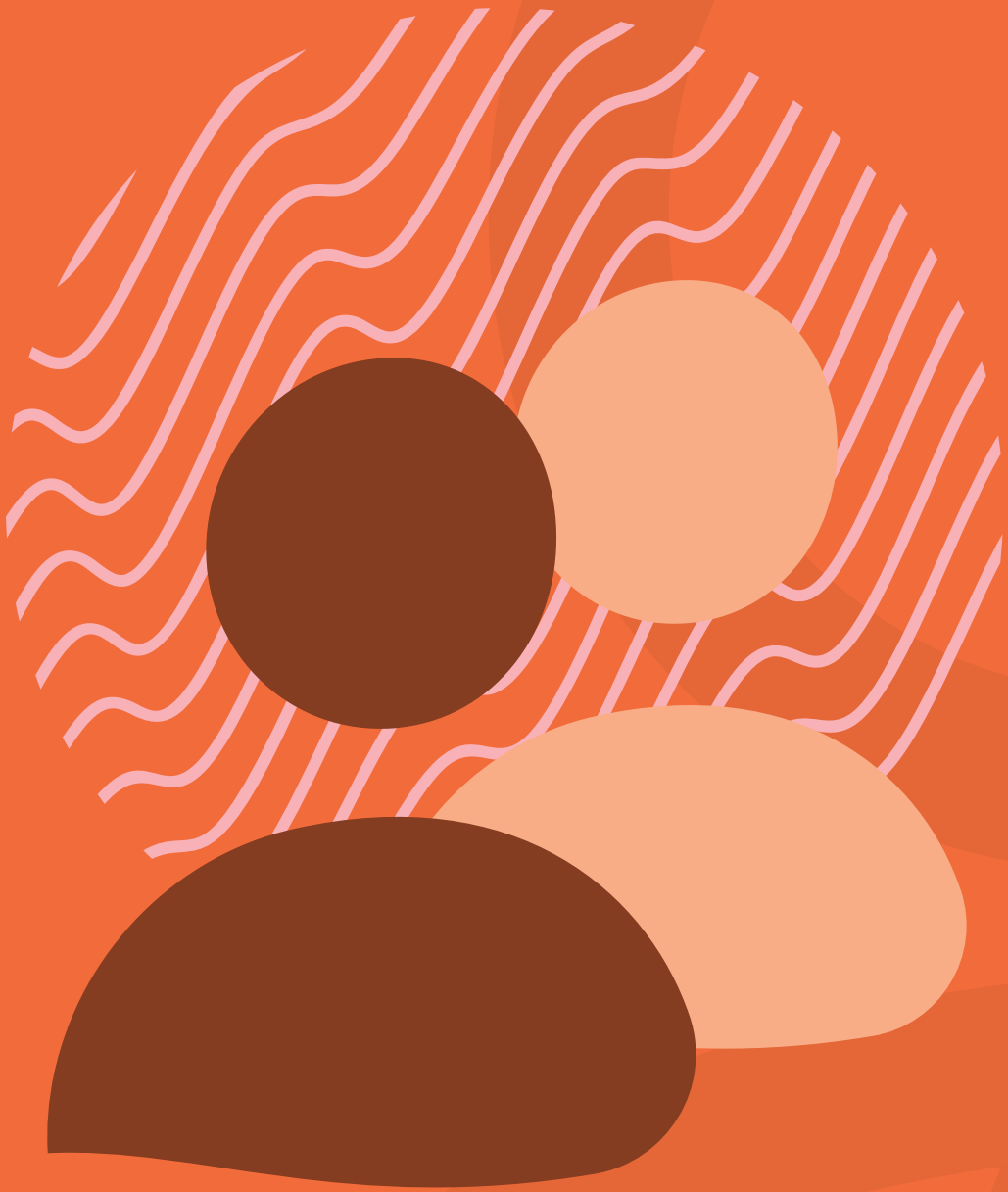
IMPACT

- The simpler experiences become, the more invested consumers are in the brands that offer them, locking into ecosystems of providers that support their values, driving loyalty, monthly subscriptions, ongoing use and upselling.
- Opted-in subscriptions to services and innovative dynamic pricing models allow brands to offer micro value, maintaining customer satisfaction and receiving payments in micro real-time.
- Brands shift to separate API-fed service ecosystems that support their products more efficiently, becoming not only technology companies, but incredibly efficient logistics and service companies.
- Short, low-touch and even 'hands-free' customer experiences are valued as more secure, especially in social distancing situations.

TECH

- AI: Microsoft AI Platform and Azure AI, Google AI Platform, AutoML, AWS Machine Learning
- API management and micro-services: Microsoft API Management, Mulesoft, Google Cross-Cloud API Management Platform, AWS API Management
- IoT: Microsoft Azure IoT Platform, Google Cloud IoT Core, AWS IoT
- XR (VR and AR): Unity, OpenXR, Microsoft Mixed Reality, Google ARCore, AWS Sumerian

WE
COLLABORATE



WE COLLABORATE

We Collaborate

While the world eagerly awaits a cure to the perils of the pandemic, the changes COVID-19 has brought are life-changing, revolutionary and here-to-stay. The need for humans, organizations and nowadays 'things' to engage in a formless, portable and resilient way is imperative, unstoppable even. The legacy collaboration systems of yesteryear have entered their well-earned final resting place at the bottom of the corporate ocean, and in their place a new vision of collaboration has emerged; flowing through old barriers and floating between 'compete' and 'collaborate'. With all becoming intimately networked with superior, simpler and ever-more ubiquitous technology and an abundance of social platforms, it's time to tap into the phenomenal power of the collaborative Technology Business, even as connections and entire ecosystems seemingly changing overnight.

Sudhir Pai
Expert in Residence

Developments that previously took years to be implemented are now being discussed, debated and decided upon in record time, and in innumerable virtual meeting rooms. Organizations have struck unique arrangements, building agile and robust structures that will last far longer than the lockdowns and quarantines of the time. Surges in the online space, digital connectivity and adoption of remote working solutions at a lightning pace testify how firms are balancing responsiveness to their consumers with the safety needs of their stakeholders, building resilient systems that can cope with catastrophes too.

The 'virtue of virtual' plays the leading role with teams all over playing the supporting parts, rising to the challenge of uncertainty. With the advent of video/audio conferencing options and tools for visualization, employees now communicate over multiple channels, becoming accustomed to a collaborative style of working rather than in focused silos. Lean structures and empowered nimble teams accelerate decision making, making strategic decisions valuable in such a dynamic environment.

The undercurrent to this collaborative tide, is a sense of trust in the capability of the workforce. Effective delegation now stands where micromanagement once served. So, while the ends are a given, the means are entirely flexible to the employee. Leaders have realized the impact that the pandemic is having on employee wellbeing, adopting a more humane and personal approach. With this empathetic style of management, leaders are focusing on boosting employee morale and creating effective partnerships with a 'we-are-all-in-this-together' approach.

The prevalence of IoT complemented with 5G will enable smart cities to gain both scalability, and trust of the masses – all with a robust infrastructure. But physical distancing should never be confused with social distancing. So, while physical distancing is the 'new norm', societies are virtually closer than ever, not only to other people, but 'things' as well. We have embarked and set sail on a journey of 'movement in reverse'; people remain at home, the enterprise is portable, and ecosystems want entities to become inside-out. While the world drowns in the waters of uncertainty, to sail onwards and reach a new dawn, we in turn should be like water – fluidly adapting to the uncertainty, all the while together.

The future lies in togetherness.

The Team **is the Canvas**

Leveraging teams-oriented workspaces for collaboratively creating joint business results

It's nothing more than appropriate that in the era of the Personal Computer, we have been doing our IT work from the metaphor of a desktop; a workspace that arranges applications and information from a highly individual perspective. Now, in the era of working online, the canvas on which we produce is much more shaped by the teams we are in, the social graph of people inside and outside these teams, the way teams collaborate to achieve common goals, and the information that is needed and produced while doing so. Our preferred palette of technology tools in business changes accordingly, equipping us with a predominantly Team state-of-mind when creating our next starry nights.

Judith Kennes
Expert in Residence

WHAT

- Open and secure collaborative platforms provide a shared workspace, combining many of the previous collaboration and communication solutions in one.
- Where collaboration is needed, tools pop up as 'plug-ins' to perform specific tasks such as brainstorming, working on a 3D prototype, or developing software.
- Entirely programmable, these platforms use low-code to create mini-applications, increasing productivity and unleashing the potential of data.
- Supported by AI, surveys and online learning environments, improving a team's skillset becomes a continuous process.
- Internal and external meeting rooms and huddle spaces are easy to book, ready to connect seamlessly to a room on the other side of the world.

USE

- Leveraging a fully agile approach, GitHub ran their design studio digitally in Mural, keeping their remote team aligned while rapidly and collaboratively developing their new campaign, leading to the award-winning brand video 'Building The Future'.
- Workplace is used by Decathlon to simplify communications between employees and the organization; igniting employee engagement by running their Employee Happiness Survey, and enhancing the creativity and innovation through open communication.
- Microsoft uses the WorkBoard platform to collaboratively work on defining and achieving their Objectives and Key Results (OKRs) throughout their organization.
- Using Jira and Confluence, Audi customers communicate their personal requirements to the business. Confluence stores and shares knowledge, department protocols, meeting notes, and policies.
- Capgemini used Hopin to deliver the Global Architects Summit 2020. This annual learning and networking event – normally only accessible to a select group – was opened to all its employees, delivering a virtual event over 5 consecutive Fridays.

IMPACT

- Being physically apart challenges our social connection, but collaboration platforms and augmented reality bring people closer.
- When provided with an open and secure platform in which to work, teams can be very productive, challenging tasks and working towards a common purpose.
- By choosing their own toolset, teams create a team identity or signature, leading to more creativity, innovation and motivation.
- Enhanced freedom and motivation resulting from choosing work time, place and setup.
- Teams are more diverse and inclusive; location, background and physical appearance become irrelevant, with different skills that add to the dynamic team canvas more appreciated.

TECH

- Collaboration platforms: Teams & O365, Confluence, Slack, Gsuite, Workplace, Workboard
- Virtual meetings and events: BlueJeans, Zoom, Hopin, Adobe Connect, Cisco WebEx
- Augmented reality: Spatial on Oculus
- Whiteboard: Miro, Mural, Deon
- Surveys / quizzes: SurveyMonkey, Mentimeter, Kahoot
- Learning: Coursera, Degreed, Pluralsight

Fluid **Workforce**

Adaptive orchestration of skills to beat complexity and thrive on unpredictability

Under pressure, everything becomes fluid. And pressure is there, given the highly volatile and complex vista of the current global landscape. Businesses need to be highly adaptive in how they orchestrate their workforce. They must become anti-fragile, fluently accommodating evolving market demands and needs for skills. Agility, learning culture and staffing flexibility are at the core. Peer-to-peer platforms increase transparency and connectivity across any role or organization, making organizational boundaries irrelevant. AI supports the dynamic matching of skills and interests with jobs to be done. In a future that seems certain to be swarmed by Black Swans, a technology-enabled fluid workforce is the default.

Isabell Schastok
Expert in Residence

WHAT

- As a response to the pandemic, organizations were forced to experiment with virtual and remote working, resulting with experiences of reduced employee stress, increased productivity and cost savings boosting hybrid operating models.
- Remote working options and fluid workforce models expand the availability of skills; 89% of organizations plan to expand the fluid workforce model across a wider range of functions to meet increasing demand for critical skills.
- Finding the balance between 'traditional' and fluid workers requires a plan for both types of workers aligned to business strategy, job roles and skills requirements. It is supported by an HR-enabled 'workforce architect', to enhance skills-based staffing, on-demand work allocation and real time response to changing business needs.
- Also, the manager role needs to be reinvented to engage a more diverse workforce. A holistic talent approach designed and implemented for both permanent and fluid workers, helps with this.

USE

- As a reaction to Covid-19, Airbus enabled 300 of its employees – including its Executive Committee – to work remotely and securely on a new cloud-based digital workplace solution within just 72 hours.
- A global OEM built a digital employee experience for all workers with the help of an application, including functionalities for collaboration, internal communication, personal development and career planning.
- Syngenta reimagined its Human Resources function, standardizing global processes and introducing best-in-class digital tools to achieve greater effectiveness and a better employee experience.
- A French bank identified a need for their IT department to transform towards an agile operating model by 2023, outlining HR actions to establish a dynamic job and skill management solution.

IMPACT

- Improved time to market and increased agility, better alignment of talent, enhanced customer satisfaction, as well as improved brand perception and sales.
- Reduced reoccurring costs; organizations are roughly looking at around 12% of the permanent roles to be moved to fluid.
- People analytics and AI-powered tools allow proactive HR workforce planning, including skill-based staffing and supply and demand management.
- Individualized employee experience and talent management increase employee engagement, team productivity and efficiency.

TECH

- Workforce Planning/HR Solutions: Capgemini People Analytics, IBM Talent Management, Workday HCM, SAP SuccessFactors, Upwork Inc, Honeypot, Braincities, Faethm
- Self-management and work effectiveness solutions: Sapience, holaSpirit, glassfrog, Team EQ, Trello, Monday, Amplifai
- Employee adoption and well-being management solutions: InsideBoard, Peakon, Lattice, 15Five, Quantum

New Chain **on the Block**

Using distributed ledger technology to drive next generation trusted business ecosystems

Excellent connections create excellent results. What if being connected and carrying out transactions in an ultra-safe, transparent, and effortless way comes to you as a fluent platform capability? Well, there's a new kid in town that seems determined to stay - even if its street-credibility is being questioned every now and then. No longer a new term, blockchain underpins next-generation ecosystem platforms that act as public ledgers for open, collaborative transactions and 'smart' contracts. It provides trustworthy connection capabilities that speed up transactions, to go direct, and provide full transparency, while ensuring data integrity, privacy, and security. It seems we're in the middle of a chain reaction!

Muhammed Ahmed
Expert in Residence

WHAT

- Each transaction on a peer-to-peer network is recorded as a 'block', with each block chained to the previous, which is immutably recorded using cryptographic trust and assurance mechanisms.
- 'Smart Contracts' are self-executing programs based on predefined conditions without relying on a trusted authority to increase transparency, efficiency and accountability.
- 'Tokenization' creates a fundamental shift in the trading of assets. Blockchain and tokens can make the trading process efficient and reliable, increasing the volume of trade and opening the possibility of trading more illiquid assets.
- There has been a rapid rise in industry and domain-led partnerships through consortia and acquisitions underpinning the idea of ecosystem collaboration to achieve business outcomes.

USE

- Many central banks are aggressively exploring blockchain to digitize currencies through Central Bank Digital Currency (CBDC) bringing the benefits of cryptocurrency to the traditional banking system.
- 3 major banks in Australia are using blockchain to digitize bank guarantees to reduce the time, cost and risk involved in the current paper-based process. Banks can issue bank guarantees in just one day which could otherwise take several weeks.
- Blockchain has found extensive applications in the supply chain with large scale implementations (e.g. TradeLens, Food Trust) aimed at assuring product quality and integrity as it moves from producer to the consumer. It can improve supply chain efficiencies ensuring safe, transparent and efficient distribution of products ranging from coffee to COVID vaccine.
- Decentralized energy trading marketplace uses a blockchain-based platform to trace energy origin and allows prosumers to sell excess electricity to achieve carbon neutrality.
- The Blue Catalyst initiative demonstrated the great potential for blockchain, carrying out transactions around Know Your Customer (KYC) and Know Your Supplier (KYS).

IMPACT

- Redefines the identity management process by offering a secure and trustless means to establish identities in KYC-applications, health data sharing, etc.
- Smart Contracts improve process efficiency and improve transparency by executing trusted, verifiable and tamper-proof transactions without the need for intermediaries.
- Central Bank Digital Currency (CBDC) can digitize currency leading to cashless transactions that are quick, efficient, secure and convenient.
- Blockchain's added value can be seen in how the technology integrates with other breakthrough technology drivers such as AI and IoT, such as UNICEF for tracking vaccines.

TECH

- Blockchain Platforms: Hyperledger, Ethereum, Corda, IBM Blockchain Platform, ConsenSys, arcblock.io, stellar
- Business-focused consortia: R3 (banking), B3i(insurance), CBSG (telco), MOBI (auto)
- Technology-focused consortia: Hyperledger, Enterprise Ethereum Alliance

Use the **5G Force, Luke**

Tapping into the potential of 5G networks to create brand new, highly collaborative business propositions

5G is so fast and agile, not even a Jedi light saber can beat it. But the huge improvements in bandwidth and latency are not the only drivers that spark the revolution. With so many more people, devices, things and entire organizations soon connected in real time, there are many brand-new, collaborative business opportunities. Whether it's on the road, in the air, at sea, in cities, factories, in warehouses or at home; the phenomenal ecosystem power of 5G enables man and machine – or machine and machine - to work together in previously unthinkable ways. So, don't just get blinded by the blistering speed: look at the much broader potential of a hyper-connected world. As Luke quite rightly explained, "the force is the energy between all things, that binds the universe together." May that force be with you.

Monika Gupta
Expert in Residence

WHAT

- According to GSMA, the investments in 5G networks will reach $1 trillion worldwide by 2025.
- 5G is not only getting 1GByte/s at your fingertips, but the latency is also significantly lower, not to mention the vast number of handsets that can use the network at the same time. So, there's more data, faster and constantly available.
- An enabler for IoT – 5G connects various sensors, actuators, equipment and machines to quickly transmit data right to where it is needed.
- 5G has the capability to enhance internet access to remote and underserved geographical areas, having a massively positive impact on society.
- Emerging technologies – such as edge, AI/ML, AR/VR, real-time image/video streaming – have limitless potential and applications when 5G is leveraged.

USE

- 5G trials are being conducted globally by many industry innovators and early adopters across industry verticals along with telecom service and solution providers.
- Covid-19 has led to an increased need for 5G technology, accelerating 5G deployments globally with many governments pushing for 5G and encouraging industry adoption.
- 5G chipsets and device ecosystems are becoming increasingly available. A variety of 5G devices with indoor/outdoor CPEs, FWTs, hotspots, dongles, adapters, modules, IoT routers and other devices (robots, AGVs, cameras, head-mounted displays, gadgets etc.) are becoming available in addition to smartphones.

IMPACT

- Benefiting consumer and industrial markets alike, by increasing reliability, security, network slicing, device density and power efficiency.
- An IHS Markit study estimates that by 2035, $13.2 trillion in global economic value will be attributed to 5G, generating 22.3 million jobs in the 5G global value chain alone.
- The impact on the environment through energy consumption cannot be denied, however. Downloading gigabits of data through game or video streaming is increasing our Carbon Footprint drastically and connecting billions of objects to fulfill data lakes centers requires a new way of architecting our digital world.

TECH

Specifications & Papers: 5G in industrial operations, Harmonizing Standards For Edge Computing, Arming 5G Private Networks with Altran, Industrial grade 5G, 5G Network Automation, 3GPP Release 5G specifications, WHO 5G mobile networks and health, 5G Network Operations: AI/ML Based Recursive Autonomic OSS, Back to the 5gG Future

Creative **Machine**

Unleashing a new wave of man-machine creativity by letting AI do the heavy lifting of producing it

What if AI writes your haikus? It seemed the final frontier; where technology would automate our repetitive, mind-numbing tasks, we would find our new forte as humans in creativity – an area where AI could never match us. Turns out that Generative Adversarial Networks (GANs) – in which AI systems collaborate in creating and testing results – can create spectacular results in areas as diverse as images, video, audio, text, art, products, medicines, games, and even entire business models. When done well, AI and humans together unleash a new era of great creativity. But the boundaries of what is real and what is fake are stretched, and it takes more than a poetic mind to deal with that.

Gert Helsen
Expert in Residence

WHAT

- GANs let two self-learning neural networks compete against each other: the first one, the generator, attempts to produce realistic data. The second one, the discriminator, tries to determine whether the data is plausible. A feedback loop between the two continuously improves the performance of each other.
- GAN technology has a multitude of applications, from design of software to interiors of houses and fashion, but also the creation of text, music, video, audio, books, art, and test data.
- The possibilities are truly endless, and we are only scratching the surface on the future capabilities of creative AI.

USE

- Biotechnology company, Insilico Medicine announced a generative AI solution was key in their discovery of a medicine for the prevention of fibrosis.
- British news and media company, The Guardian published the article "Are you scared yet, human?" written solely with GPT-3, OpenAI's language generation model.
- In March 2019, Kogan Page published "Superhuman Innovation"; a book not only about artificial intelligence, but it was also co-written by AI.
- Another example is the creation of a new song entirely by AI, that sounds as if it was written by Beethoven.
- In the health industry, generated synthesized data improves the data quality of health screening such as MRIs and brain scans.

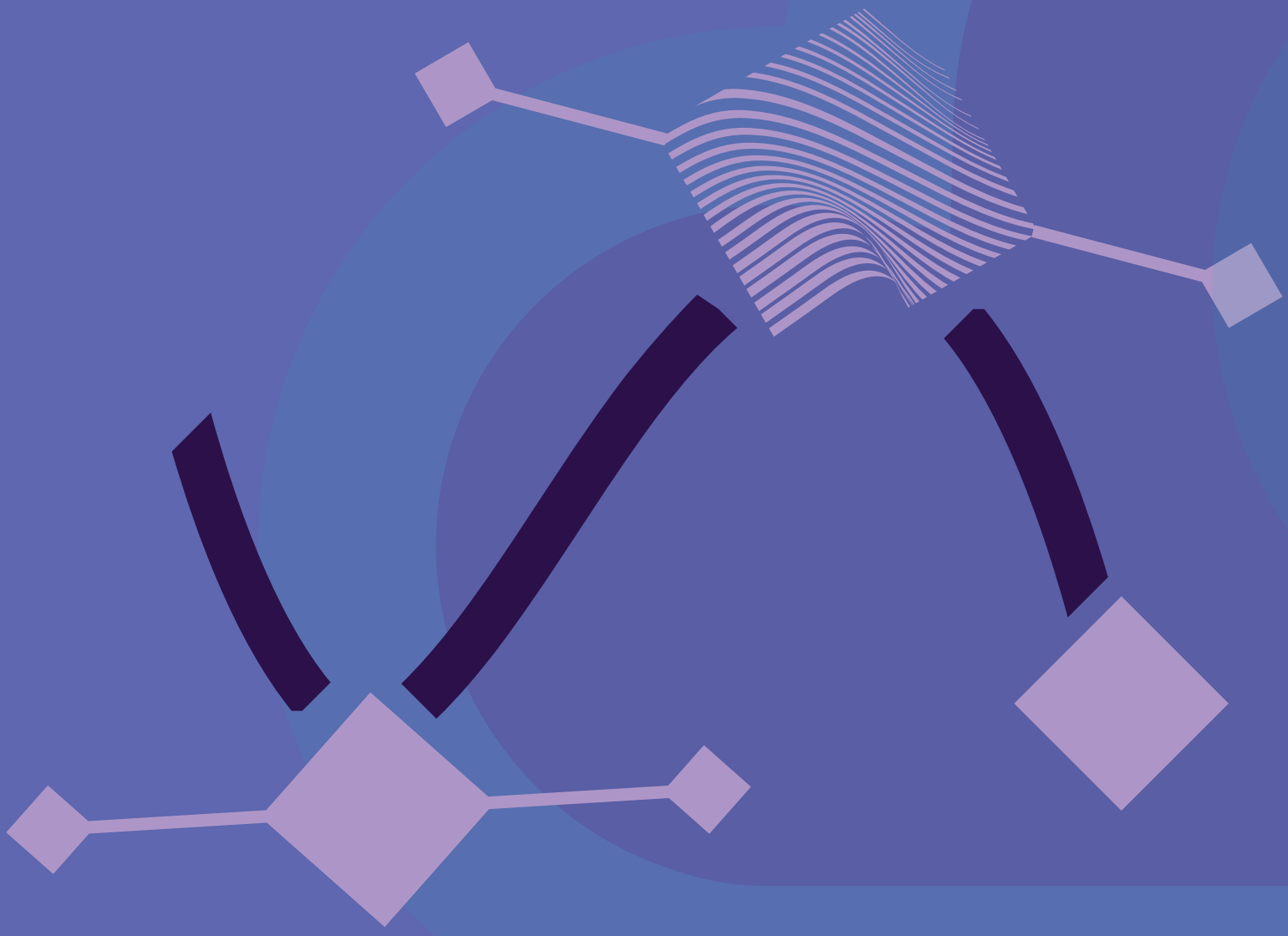
IMPACT

- Cost reductions due to automation and augmentation of human creativity and processes.
- New creative solutions – previously unthought of – from humans collaborating with machines.
- Synthesized data in testing results in the improvement in the quality of products and processes. It also answers any lack of existing data, or cost to collect or produce it.
- However, the fake news debate continues as people are no longer able to separate real from fake, resulting in potential security risks and a need for GAN-synthesized detection.
- GAN technology raises questions in terms of Intellectual Property: the USPTO denied patents filed by AI on behalf of DABUS, and published a ruling stating US patents can only be granted to "natural persons."

TECH

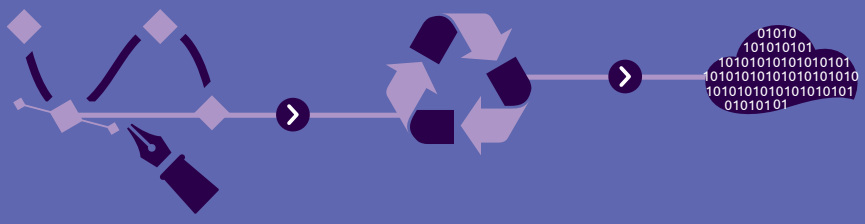
- GAN: StoryGAN, DiscoGAN, ArchiGAN, GameGAN, StackGAN, Google GAN, GAN Lab, GANImation
- Language: Generative Pre-trained Transformer 3 (GPT-3) for text generation
- Applications: producing hyperrealistic images of non-existing people, an Art Gallery created by Artificial Intelligence, generating new images every hour, Adobe Sensei for AI-enabled creation of marketing and creative content
- Sogeti's report on Creative AI research: Infinite Machine Creativity

BALANCE
BY DESIGN

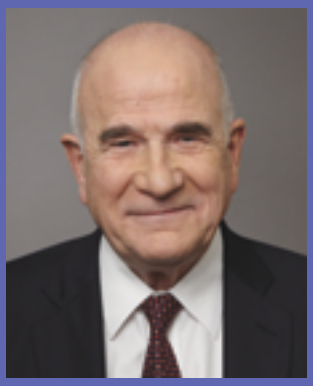


BALANCE BY DESIGN

Balance by Design



TechnoVision's aim is help you build and develop your Technology Business. To provide you with the rich technology construction materials to do just this, the first six TechnoVision containers provide a logical display into the art and science of the possible. But how do we do it? What are the guidelines that need to be observed? What are the principles every Technology Business should know and respect? To help you approach these questions, this seventh container – Balance by Design – offers principles to consider, simply, methodically. While the trends make up a full technology menu, the principles make up the recipe to leverage the trends. Each principle makes sense on a case-by-case basis, but when taken together and systematically put to work, they help you make your Technology Business a winner.



Pierre Hessler
Expert in Residence

Presented on a single page, each principle moves intentionally from its definition and purpose to a list of suggested implementation steps, before concluding with the all-important measurements of outcomes.

As its name ***Balance by Design*** indicates, the container aims – among this time of disruption and discontinuity – to help us maintain our sense of direction, remain standing, or find a new footing. All design principles underpin achieving 'Water-like' qualities, each within their own, unique context as follows:

Since time immemorial we design and implement systems for speed, efficiency and user-friendliness. But not for coping with inevitable failures and unexpected change. Adapt First proposes to build adaptability into each and every development, from the very start.

In today's marketplace, having an open technology platform is a necessity. But when everything else is open as well, you have to unleash a charm offensive to attract the right clients and partners. In this guise, ***With Open Arms*** helps you create a business magnet.

Technology ∈∋ Business stems from the observation that 'just' aligning business and technology is not enough. Technology Businesses will only work when all involved consider themselves part of the same team.

IQ EQ CQ UP combines the three dimensions of brain and heart power: intelligence, emotional intelligence, and creativity. With a premium for creativity, you can use your corporate brain and your corporate heart for creation.

Trust is the headwater stream for Technology Business. But its flow is under attack. As such our ***Trust Thrust*** principle has never been of greater importance. Proactive trust secures the foundations of r a Technology Business and provides a differentiating face to the market.

No Hands on Deck is quite the challenging ambition: providing autonomy to automated processes. More systems already create, manage and adapt themselves. A reduced number of hands on deck guarantees the smoothest sailing under the roughest conditions.

Finally, the mantra of ***What's Our Story*** always has promoted dialogue as a key driver for change. But with today's companies committed to growing their own, refreshed sense of purpose, this dialogue has a new and compelling sense.

Adapt **First**

Move Adaptability from Afterthought to Prime Time

Be like water: such a gripping metaphor. But what does it mean in practice? Businesses grasp that they need to stand up to change, to adapt quickly, again and again, or otherwise be condemned to the depths of irrelevance. Yet, anticipating change and rapidly adapting to it is a tall order for most businesses and even more for their IT systems, often better known for their complexity and inertia rather than their flick-of-a-switch responsiveness. Small, marginal improvements no longer make the cut. To make the big screen, systems need to be built for adaptability from the get-go, not as a backwards glance or afterthought.

Thilo Hermann
Expert in Residence

WHY?

You hear that, Mr. Anderson? That is the sound of inevitability. Crises will occur. Failures will strike. Opportunities will arise. Change will come, some to be expected, more in unexpected ways. Adaptability is the essential quality to deal with it. A company's business agility largely depends on its technology agility. But it is painfully difficult to build adaptability into systems only when it is needed.

Systems should be envisioned and built by design for dealing with disturbance and change. The full next-generation toolbox of technology enablers should be considered – from 'mesh' API services and self-improving IT operations up to open, secure data sharing, AI, and autonomous systems. It's also about the mindset that the internal and external context will always, routinely, be disturbed and break: when Failure is an Option, it becomes an opportunity to learn, anticipate and improve. Operational efficiency used to be the mantra. Now it's water-like adaptability and continuous, 'StratOps' agile strategy delivery. Right from the opening scene. Dodge that!

GO FOR IT!

1. Change is not the enemy

Your IT portfolio needs to adapt and change at the speed the business context requires; create a mindset that welcomes comfortable and uncomfortable change, not demonize it.

2. From project to product

Projects no longer end, they keep going until they retire; by thinking products rather than projects, your business will be always evolving, in tune with the latest market developments.

3. Architect to adapt

Follow architectural patterns that create an agile mesh of micro-services and data; look for AI to drastically increase responsiveness and learning.

4. It will break

Assume your business and IT systems will be disturbed - even break. Build in processes, organizational structures and system capabilities that deal with failures and learn from them to improve resilience.

5. Search for the sweet spots

Grow an always explorative mindset to maintain an actionable heatmap of the movers and shakers of your business: where to expect impact from legislation, the future of products and services, new partnering opportunities

6. Prepare your change A-Teams

We all love it when a plan comes together; but it is even better to set up unified, cross-organizational teams – a symbiosis between IT and business folk – that can absorb and action on continuous change, especially when it's not in the plan

MEASURE

- Time to change
- Resilience

With **Open Arms**

Turn your open platform into a business magnet

Some of us may be old enough to recall when companies decided to open up their systems and link with partners (EDI, anyone?). It took quite some courage, to open these first little doors into the company. Well, that ship sailed a long time ago. Now, you need to be open to new opportunities, collaborations and business models – as and when they arise, certainly not only as planned. And you're not the only one trying. In order to stand out, you need to move to a state of decidedly active openness, attracting partners to collaborate with you – rather than 'just' making it easier to do so. Only then will your open platform evolve into an exciting, irresistible business magnet.

Patrice Duboë
Expert in Residence

WHY?

Day in, day out, you compete for customers, for clients, for people. And as if this were not enough, there comes a new competitive front: the battle is on for the best outside resources to collaborate with. This is not just about your traditional partners, but also about start-ups, venture partners, and even a fluid workforce of subject matter experts. The flexibility of these outside resources will combine with yours to give you market power, market viability, and resilience. To make your business attractive in this fast-moving outside world, don't solely rely on a clear purpose and shared convictions; add a healthy dose of technical pulling and sticking power. Your platform strategy can no longer provide just standard entry doors. It needs to provide the most inviting place to be in the neighborhood. It must offer comfort, empathy, flexibility, incentives, and full service. Once your partners are in, they will definitely want to stay. Like Hotel California. But in a nice way.

GO FOR IT!

1. Architect for Open

Design and build a business technology platform that enables an agile and open ecosystem; one that evolves easily, can integrate new partners, providers and clients, and can support new services at short notice, without substantial reengineering.

2. Build for Open

Develop your technical platform on standard and state-of-the-art technologies that support an agile, open ecosystem; such as cloud-based microservices, containers, open APIs and secure, collaborative data spaces.

3. Work it for Open

Provide top-of-the-bill facilities to work and collaborate – with physical proximity as an exception, rather than the default – such as facilities for teams to collaborate and deliver, securely working from home, with optimized network bandwidth.

4.Reward for Open

Deliver tangible incentives for all stakeholders joining your open platform; for example, in terms of shared knowledge and insights, new connection and partnering opportunities with other parties than yourself and – of course – financial benefits.

5.Communicate Open

Ensure sure your platform is a powerful vehicle to communicate and promote your corporate purpose and values, such as providing metrics on (collaboratively) improving sustainability, diversity or inclusion objectives.

MEASURE

- Time-to-new-service
- External users' NPS
- Partner ecosystem size

Technology ∈∋ **Business**

Shift from Alignment to Unity

You do the math: within less than a year, almost every business became a Technology Business, whether it liked it or not. Now, it no longer makes sense to distinguish between technology and business. Where we have seen the worlds of IT and business gradually move from carefully isolated compartments to more or less aligned entities – even to cross-organizational, multi-functional teams – we are now moving towards a full mutual inclusion, in order to be hyper-adaptable and responsive. The difference between the real and virtual worlds has become blurry, so much so that it can now be ignored: our real-life view is so augmented with data, we can no longer imagine one without the other. To leverage all of this, business and IT need to share the experience without filter, without any middle person – essentially becoming one.

Robert Kingston
Expert in Residence

WHY?

We have seen the path between IT and business shortened for some time now, you may have even thrown away the thick books of requirements years ago. But now, one step further is needed: it is no longer about 'just' shortening communication paths, but about joining IT and business in a true Technology Business. The water-like levels of responsiveness and adaptability needed to thrive in today's business context do not allow any obstruction, delay or noise between the stakeholders involved. The process of continuously adjusting and delivering on strategy cannot exist with any loss in translation along the way. In a Technology Business, teams work jointly on products – rather than on projects – with a potentially indefinite lifecycle, guided by shared budgets and tangible value streams. The skillsets of the team members may differ, but they will certainly overlap more over time, as a successful unity tends to do.

This becomes all the more apparent with real-time data augmenting real-life perspectives, as a digital twin of any business entity becoming one with its real-world counterpart. It's not only about pieces of data becoming visible, but data creating a full image; a fresh, new data-powered experience. To make it richer, visually appealing and understandable, IT developers should become quasi-business users, and vice versa. The business users perceive their needs, the IT developers see the path to it. There is no cycle, no process between them, but ***unified progress.*** "I'm the left eye, you're the right. Would it not be madness to fight?"

GO FOR IT!

1. Created joined product teams
Move from one-off projects to continuous product delivery, driven by cross-organizational, multi-skill teams and budgets allocated to value streams.

2. Cross-skill continuously
Ensure a continuous flow of skilling and reskilling of all team members, across the business and IT domains.

3. Democratize technology
Make data, APIs and other platform components available to the entire organization through high-productivity, easy-to-use, AI-augmented Do It Yourself (DIY) tools.

4. Augment the UX with data
Ensure the data experience becomes an integral part of designing and developing a satisfying, complete user experience – and make the data available that is needed for it.

5. Augment data with UX
For every business usage of data, consider how immersive experiences – such as Augmented and Virtual Reality, but also data storytelling – can make it more effective and actionable.

6. Measure collaboration quality time
As collaboration has become much more virtual, take the opportunity to measure and improve the amount of time IT developers and business users are spending together.

7. Award unified culture
Introduce incentives to stimulate a culture of tangible individual and team contribution.

MEASURE:

- Business user satisfaction
- IT Developer satisfaction
- Time to change

IQ EQ **CQ up**

Power up your business with all three cylinders of IQ EQ and CQ

Every Technology Business is a data-powered Business. Therefore, every initiative should increase the corporate IQ, through valuable knowledge, insights and algorithms. It also must stay in sync with the corporate EQ, as humans are key to achieving the enterprise's raison d'être. And with AI and intelligent automation shifting the man-machine balance, data can now enable more creativity as well; the Creativity Quotient (CQ) is entering the company dashboard. The only way is up!

Ron Tolido
Expert in Residence

WHY?

An enterprise will really warm up to the data-powered concept when it is able to define, measure, leverage and even externally monetize the value it creates with data assets. Data-powered initiatives become easier to justify and execute when the value delivered is tangible and undisputable. However, when under the pressure of cold-hearted facts and algorithms, data – and the many ways to activate it – will certainly diminish the human-factor. Addressing the emotional intelligence of every data-powered initiative will improve your chances. Then, data is not only driving automated decisions and actions, it also contains the potential to create new products and services. Augmented with AI, it unleashes the full creative powers of the enterprise to create brand-new business opportunities.

GO FOR IT!

1. Understand your data assets
Ensure all data assets, whether coming from inside or outside the enterprise are properly identified and cataloged for easy access and reference across the organization.

2. Create a data value business case
Build a Benefits Logic for the way data will create value as part of each initiative pertaining to corporate assets, products and services.

3.Activate data, through insights, algorithms and AI
Data should not be inactive but should be turned into actionable intelligence, high-value insights and business-augmenting algorithms, all delivering clear benefits to the enterprise.

4. Monetize it
Apply a systematic framework to identify external (and possibly internal) monetization opportunities for the enterprise data assets, possibly enabled by dedicated tools and platforms.

5. Explore the emotional dimension
Look for opportunities to enrich new and existing data-powered services and products with emotional dimensions, such as context-sensitive actions, support for sustainability and conversational components.

6. Change with emotion
Capture data points during change initiatives to actively monitor, analyze and improve stakeholder commitment and motivation; keep on learning and improving for even more successful transformations.

7. Enter the creative zone
Unleash the corporate human energy by scanning data assets for creative potential, building new or augmented innovative products and services, and possibly even reimagined business models, and use generative AI tools to execute it.

MEASURE:

- Data Value
- Employee Satisfaction
- Innovation

Trust **Thrust**

Accelerate Trust Building

Trust: one of the many casualties of the pandemic. Never an easy win, if trust was perceived as a precious asset before the world was forced into shutdown, it is now utterly indispensable. An imperative. Without trust there is no business. Technology Businesses must be trusted by customers, clients, shareholders, employees, partners, networks and authorities alike. In summary, by everyone. How can a corporate purpose even exist without trust? (Re-)building trust must be front and center of all technology decisions. And trust us: when done well, it becomes a business accelerator.

Jorge Villaverde

Expert in Residence

WHY?

If the pre-pandemic conventional wisdom for trust was "slow to earn, quick to lose", the current play or post-pandemic wisdom needs to be different. Use the best technology armory at your disposal to build or rebuild trust that much faster. We should ask ourselves: how long can we tolerate a lack of trust – in ourselves, in our organization, in others? Pursue trust-building breakthroughs, in reliability, security and transparency of course, but also in understanding, responding and adapting. A continuously evolving ecosystem cannot survive without trust between all the players involved, whether they are a keystone species or not. However, when trust permeates the ecosystem, it will power it up - , benefiting all, but especially those who gave the strongest trust thrust.

GO FOR IT!

1. Review all experience apps and build trust in
Customer/client/partner/employee experiences result from the combination of many applications. Weave a red thread of trust through them, so your applications – all together – create the reality, and generate the feeling, of dealing with a trusted associate.

2. Make trust-building a key non-functional requirement
The trust requirement will combine with other non-functional requirements, for example in terms of data quality and transparency, to create a whole new personal, confidence-building reality, and feeling, in the resulting applications.

3.Include trust into testing
Once your normal test procedures are successfully completed, let trusted users make a 'trust walkthrough' of every application, or system of applications.

4. Double your standards for data quality, inside and out
As flawless data forms the basis of trust, ensure your own data is indeed flawless. Review qualitative data to make sure it meets the same requirements used for accounting data, and vet all data produced and communicated to ensure it is of the best quality.

5. Use AI transparently
The more AI progresses, the less clear it becomes. Explain every one of its uses in terms all stakeholders can understand – if you cannot, tell it or drop it.

6. Welcome all stakeholders under the cybersecurity umbrella
Give cybersecurity coverage to stakeholders, ask them to play a part in it and strengthen their feeling of belonging to a trusted team.

7. Treat trust incidents like a security threat
Security threats get all the attention, even up to top management. Create a mirror system for trust incidents; collect data, analyze it, prioritize it and importantly, propose remedies for all trust breaches.

MEASURE:

- Attrition
- Churn
- Repeat Business

No Hands **on Deck**

Self-adapt: from automation to autonomy

Be like Water, anyone? There is nothing more autonomous than a river. It finds its own path to the sea, creates valleys or waterfalls when needed – all with just two drivers: erosion and gravity. Advances in AI and intelligent process automation makes us rethink the human factor in any aspect of business. What if the entire enterprise would be self-driving, achieving its destination without human intervention? And what if, on our way towards it, we look to benefit from autonomous technology even now? AI captain: it's time to sail the rivers and learn about autonomy through not doing.

Manuel Sevilla
Expert in Residence

WHY?

We have learned from 'hyperscale' cloud provisioning that fully automated, self-optimizing and adapting processes are mandatory to ensure seamless, uninterrupted delivery. And intelligent automation can bring just as many breakthrough benefits to other key areas, such as operations and customer experience. However, it is key to rethink the design of the process. It is not just a matter of automating man / machine interactions, it is also about re-imagining the human role – if any – altogether. Along that journey, many advantages in terms of efficiency, adaptability and responsiveness (all good 'water-like' qualities) can already be achieved, even if the notion of a self-driving enterprise may still be hidden far beyond the horizon.

GO FOR IT!

1. Select the right processes

Automating a process means a radical change, and therefore deserves investment. It needs clear business drivers, such as efficiency, time to market, scalability, quality, adaptability, or compliance. Also, the way automation is applied, needs to keep these drivers in mind.

2. Full automation means full change

When a warehouse is automated – before designing any robots – the warehouse is fully redesigned for robot use. So when a business process is redesigned for automation and even autonomy, the same level of change must be done; covering the full, end-to-end lifecycle, and harnessing the power of intelligent automation throughout.

3. Set up an architecture

Architecture is the key enabler to any substantial change, even more so in the area of automation and autonomous systems. Highly scalable processes need a highly scalable architecture. In terms of technology, the 'native' cloud, microservices and real-time data provide the royal way to go, combined with the 'everythingOps' ('everything' being 'dev', 'sec', 'data', 'ml') means of continuous delivery.

4. Keep it simple

Don't over-architect and over-engineer, just focus on what it takes to make the whole process as frictionless as possible. Every friction or obstacle – also in terms of incumbent human involvement – should be analyzed and addressed as part of the overall design style.

5. Unleash human energies

Full automation – and even autonomy – does not necessarily mean 'no humans' at all. As an example, it could mean augmenting employees that monitor the process, helped by AI and robotic systems. Humans would be tracking the user experience and discover unexpected frictions, in order to constantly improve (automated) delivery. In all cases it is a matter of keeping the balance between the rapidly shifting responsibilities of man and machine.

MEASURE:

- Scalability
- Responsiveness
- Efficiency

What's **our Story**

Put a human's face on your purpose stories

A long time ago, storytellers mesmerized every audience. Their faces wrinkled in deep crevasses as they smiled, with starlight sparkling from their eyes in kindness. Now technology tells those stories – in our private lives and in business. So how do we make these tools as effective as the memory and voice of those ancient storytellers? How do we move from a monologue to a dialogue? And how do we weave in the corporate purpose into a never-ending story that keeps on changing and flowing?

Gunnar Menzel
Expert in Residence

WHY?

Defining a corporate purpose is a worthy undertaking. It is even better when it comes alive. But how? Stories will give it life, but not if the storyteller is and sounds anonymous. People listen to stories told by other people, not companies, and certainly not machines. Only humans can tell personal stories, stories with a sense of purpose; your company's purpose, for example. With a clear sense of purpose, a human story will grab attention, but also the fancy, of your relations. In turn, they will want their story to be heard – and so the dialogue begins; between two people, not between one person and a company. We all want to be part of the story, part of the game, and a good game never stops. 'What's your story?' becomes 'What's our story?'. Now there's a happy ever after.

GO FOR IT!

1. Reshape interactions into balanced dialogues
Ensure that each interaction is delivered as a 'person centric' conversation which has a clear start, middle and end.

2. Ensure its personal – connected with your purpose – tell a human story
Ensure that your 'person centric' conversation is centered around the impact you want to make.

3. Build joint solutions in a 'hothouse' setup, on the workshop floor
Each 'person centric' conversation is unique; each tells a story of how your product will make a real difference to everyone as well as to wider society.

4. Ensure more conversational and intention-driven design
Make sure that each 'person centric' conversation is personal, that it addresses and touches real needs with clear intentions in mind.

5. Favor natural language across solution designs
Use non-technical speak; make sure that the way you deliver the messages and engagements uses natural language.

6. Turn dense documents and A0-size diagrams into learning exchanges
Try to minimize the use of large, detailed and complex technical diagrams and outlines. Instead connect and engage in a simpler, non-techie way.

7. Engage and mobilize, rather than educate and inform
Make sure that each engagement has a clear call to action; ensure each interaction is interwoven with your purpose, making it our purpose.

MEASURE:

- Repository of Business Stories
- Opportunities to bring interaction

APPLYING **TECHNOVISION**

APPLYING TECHNOVISION

Applying **TechnoVision**

There are many ways to apply TechnoVision, like brainstorming entirely new ideas, systematically crosschecking an architecture, design or invent on innovation potential, using it as a playful dialogue tool between all involved in technology business change, or just trusting on good old serendipity to find an unexpected angle when tackling a tough challenge.

Above all, TechnoVision is a tool to tell a Technology Business story; a story that shapes an opportunity, answers a question, gives direction, resolves an issue, or simply delights an audience. It is always a story to be told between people, from both the business and IT sides of an organization (if there are still different sides, that is). Choosing the right building blocks – studying them, interpreting them, discussing them with others – is already part of the storytelling. Then, the blocks are woven together with other views, considerations and scenarios to create a unique Technology Business story that addresses a specific need, challenge, or opportunity.

There are of course more ways to getting a rough cut of relevant technologies, for example through a trend radar or S-curve 'hype cycle', or other complementary approaches that may prove useful. In short, anything that triggers the need for a compelling technology business story will do as long as it's simple, fluid and adaptable to change.

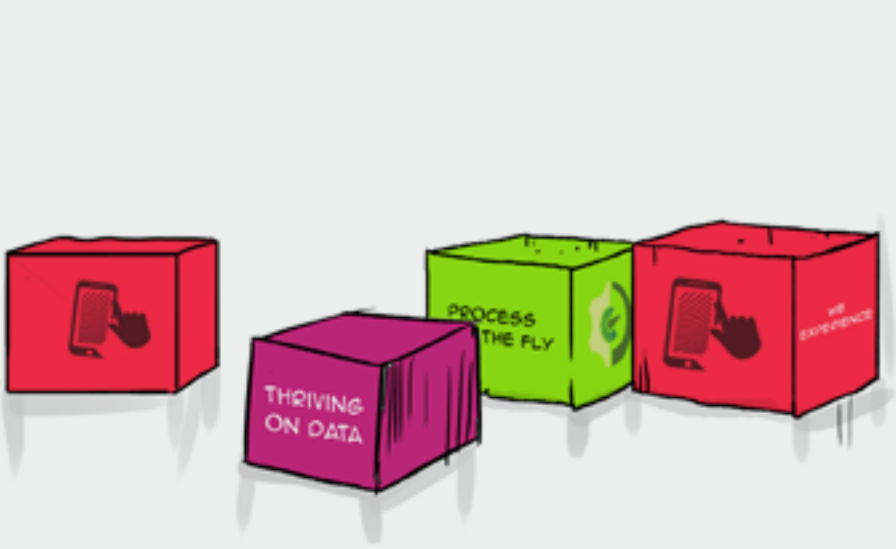
The TechnoVision framework has been 'boxed up' with a very specific intent (not only to find out who can create the tallest totems, although it has been tried). Each of the 37 trends are turned into colorful, real-life cardboard boxes, each box containing a short elevator pitch of a trend and with a QR code for more detailed content. These boxes can be picked up, carried away for study and discussed with others. Together, they can tell a technology-enabled customer story, a day in the life of an employee, a breakthrough in a process, or a new, disruptive product.

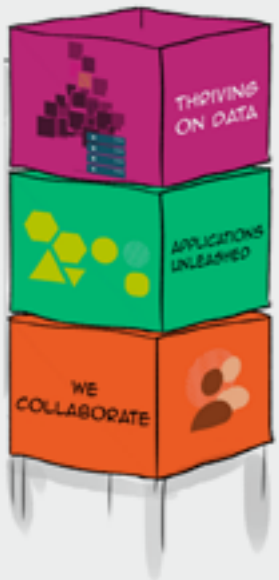
As a rule of thumb, we prefer to apply TechnoVision in a lively workshop setting. Usually taking place in one of our Applied Innovation Exchange (AIE) labs, or our Accelerated Solution Environment (ASE) environments. However, as with the Covid-19 pandemic shaped the world, so it has shaped our approach to applying TechnoVision, requiring us to think differently, and all the while working from home – for most of us anyway. While there is no real substitute for human contact, the very nature of TechnoVision means it can be applied very easily within a virtual setting. Or if you prefer more of a physical approach, the box designs are available for free, so you can print the boxes in your own home to use in a virtual setting with others. There's already a VR version of the TechnoVision theater – developed within our AIE network – enabling teams to work together in a session from different locations. The options for discovery with are truly limitless.

The full list of ways to apply TechnoVision is as follows:

- TechnoVision Theater (with boxes)
- Business Model Canvassing (with boxes)
- Repositioning
- Digital Picture
- Storytelling
- Grab a Box (with boxes)
- Applying TechnoVision Virtually
- #TweetMyArchitecture

We welcome hearing about other best practices and are most happy to share any additional format you have pioneered yourself around applying TechnoVision.





TechnoVision **Theater**

Create technology stories that address business challenges, opportunities, potential innovations, strategies, or architecture. Use TechnoVision Theatre as an introduction to general technology trends, or as a teambuilding tool to familiarize business and technology teams with TechnoVision's capabilities. You can even apply it as a hands-on 'ice breaker' during transformation workshops.

Who's it for?

This method lends itself well to representatives with little or no technical knowledge, expertise, or experience. The session can be completed with a small team of three to five people, but it is more effective with multiple teams reporting out to each other and building on each other's stories. Sessions of up to 50 attendees, spanning seven teams, have also been successfully conducted.

Preparation

Participants will preferably have some basic knowledge of TechnoVision, although we do understand it can be difficult to gather a team consisting of equally informed members. Before starting, make sure you have built up the TechnoVision 'wall' with boxes, positioning the cluster areas and boxes in the right sequence. The cluster 'header' should be on top of its pile and the trends sorted according to their sequence in the TechnoVision document. This not only facilitates the process but can also be used as a tool to explain the TechnoVision framework.

Documenting the session is a must; using video recording or supported by a live cartoonist.

The session also needs a credible problem-owner that:

- Can express the challenge crisply and convincingly
- The teams report out to
- Supplies feedback to the team and provide an overall summary at the end

Introducing the workshop

The workshop opens with a short, high-level introduction of the TechnoVision framework, the structure of the clusters (the 'what') and design principles (the 'how') and relatable examples. Rely on the attendees to study the content of the blocks themselves after selecting them and provide just enough information to help them make the right choices for the building blocks. Then, describe the process of forming teams, building a technology business story, and reporting out. The problem-owner describes the challenge at hand; it can be a strategic question, a conundrum, a quest for ideas, a process redesign, service, or product.

The format

Form the teams. Team size will depend on the number of people and time available (more report-outs take more time) Each team selects a few building blocks that are of interest for the challenge at hand. The selection should typically consist of a minimum of three building blocks and a maximum of seven (five seems a good average). The 'header' building blocks should not be selected (although quite a few teams have been known to break the rule with positive results).

If while building a technology business story a team decides that a block is not as useful as anticipated, another box may be selected. Of course, the rejected block needs to be put back into the pile for potential use by other teams.

The teams should study the building blocks, reading the elevator pitches on top of the boxes and maybe scanning the unique QR codes with their smart phones for more information. If the boxes are examined by individuals, team members can then explain the boxes to each other. By building on each other's ideas, the digital story gradually comes together through the combination of building blocks from several colored clusters. It is worth mentioning that focusing on one cluster per team is a successful, early format as well. Teams can choose to combine technology building blocks from the six clusters along with the 'mindset' blocks of the Balance by Design cluster; after all, a good story often involves both the 'what' and the 'how'.

Take 15 to 30 minutes to build a technology business story, depending on how much time is available.

Reporting back

Each team reports out to the problem owner in their own way. The blocks are typically stacked while telling the story to illustrate the enabling role of each building block within the storyline. Some teams prefer to simply create a pile, but we have also seen more creative constructions like totem poles or arcs. Each team should not take longer than five minutes to report back, keeping the story crisp and to the point. A cartoonist may capture the story, or it can be recorded. Teams should photograph the final box construction for later use. The other teams provide initial feedback to the story, followed by the problem owner. A feedback round should be time-boxed to five to ten minutes each, depending on the time available.

The problem owner gives a final summary and assessment after the last report-out, possibly selecting stories or story elements and suggesting potential future steps.

Business Model **Canvassing**

Develop insights into how technology can change the business models of organizations with two compelling approaches: the Business Model Canvas (BMC) method and the TechnoVision building boxes. Participants will gain a working knowledge of these approaches and create a list of potential business model improvements or changes. We suggest taking a picture of each idea and having a separate meeting (after about two weeks) to validate the feasibility of the idea within the organization and to identify some potential next steps.

Who's it for?

Participants are business and technology representatives, with no specific requirements in terms of knowledge, expertise, or experience.

Preparation

Preferably, participants will have already familiarized themselves with both TechnoVision and the Business Model Canvas approach (many instruction videos are available on YouTube for the latter). Before starting the session, make sure you have built up the TechnoVision 'wall' with boxes, positioning the cluster areas and boxes in the right sequence. This not only facilitates the process but can also be used as a tool to explain the TechnoVision framework. Then, draw a large BMC model on the ground using painter tape.

Introducing the workshop

The workshop starts with a short introduction on both models. For TechnoVision, introduce the framework (the seven building blocks), the structure of the five elements within each of the building blocks and the seven design principles. Do this on a high level and provide some examples – no need to dive into detail yet. For Business Model Canvas, explain the origin (notably how Ostenwalder used the model to write his book) and the different elements of the Business Model Canvas.

The format

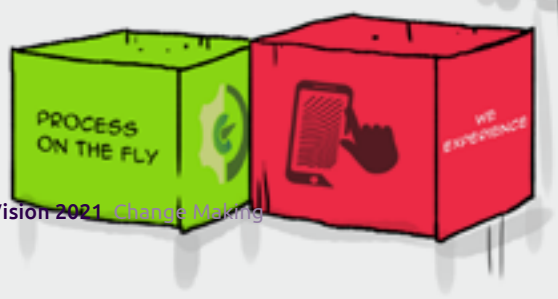
After the explanation, take one example of a company that most people will be familiar with, or is bankrupt or highly successful. Take some boxes and explain which elements the successful company put in place so they stand out from their competition, or move boxes into the BMC model to illustrate what the bankrupt company could have done differently.

Next, ask the participants to consider their own organization or a specific part of their business (organizational unit or product). Let them generate ideas about how the technology building blocks can be used to improve business performance or even entirely change the organization. Let them physically place the boxes in the model on the ground. Encourage discussion, play for about ten minutes and ask for a report-out.

Reporting back

If you have a large group, you can split it up into groups of four or five and have them report out to each other. Depending on the time, you can have multiple rounds. You will see that the stories improve with each round. Take a picture of each model and write a one-sentence description. If possible, print it out. At the end of the workshop, these prints can put on a two by two matrix, labeling the axes as 'impact of the idea' and 'ease of realization'. The big impact ideas that are easy to realize are the ones the participants should take with them to elaborate on later.

Let the participants give a short statement on the insights they gained. Then, let them all take one box that they found particularly interesting and take a group picture with the boxes.



Repositioning

Examine existing development projects, and operational applications, to boost their technology business orientation and role, by first checking if and how they make use of innovative technologies, and secondly, tuning, amending, enhancing or repositioning these applications to take better advantage of new technologies. As a result, existing and past investments are not wasted on the path to becoming a Technology Business. They are updated, pruned and rejuvenated for faster progress. For example, an on-going Customer Relationship Management project will be re-oriented towards a series of smartphone applications and bots with a radically different distribution of roles between customers and employees.

Who's it for?

Project teams, together with two kinds of challengers - one or two with knowledge of the application field, and one or two with knowledge of the new technologies.

Timing of initial positioning will play a part:

- For developments: soon enough to make changes with minimum effort
- For operational applications: after six or 12 months of run, depending on estimated rate of change of functionality and technology
- Repeat after 6 months for developments, 12 months for operational applications.

The format

Depending on complexity, repositioning takes between two hours and two days. The repositioning steps are as follows:

- Walk-through the application in development or as is.
- Comparison of the application with state-of-the-art thinking.
- List potential adjustments with a rough estimate of corresponding efforts; list potential simplifications or eliminations with rough estimate of corresponding savings.
- Go through the TechnoVision-based checklist and create three categories:
  - Used already
  - Not used and relevant
  - Not used and irrelevant.
- Combine functional changes and "not used and relevant" technologies to create a list of potential repositioning actions.
- Decide on actions based on impact and effort required.
- Plan actions in relation with the original schedule.

The **Digital Picture**

The Digital Picture is a Capgemini methodology used to produce an accurate image of an enterprise's Technology Business position. It is produced by combining the points of view – expectations compared with reality and experience – of various stakeholders, from top management to customers of the enterprise. The Digital Picture can be usefully completed and detailed with a TechnoVision-based image of the enterprise's position in Technology Business.

Who's it for?

All people with a thorough knowledge of the technical position of the IT department and of other holders of information technology in the enterprise, as well as one or two connoisseurs of TechnoVision.

Preparation

None, except having available the pictures or forms needed to capture status.

The format

The work takes the form of a dialogue between the TechnoVision connoisseurs and the people with the technical knowledge, including:

- The connoisseurs of TechnoVision give a description of a cluster's content, starting with the Design for Digital principles and continuing from left to right along the framework with the content clusters.
- After the description of each cluster, people knowing the technical position of the enterprise describe it for this cluster's principles
- or technologies.
- Collectively, the positioning is completed with the color-coded attributes:
  - green: adequate knowledge and capabilities, solid actual and planned uses
  - orange: significant gaps between technology's potential and actual mastery and use
  - red: technology's potential ignored and therefore not used or envisaged.

This work can, of course, also be done at a lower granularity level, by design principles and trend individually.

Storytelling

Use TechnoVision to tell a Technology Business story. Of course, TechnoVision is just one of the ingredients of your story, but it adds structure and content. For example, to discuss the accelerations the digital world requires and enables, you can start with the cluster You Experience. To understand the speed expectations of digital people, move to We Collaborate. If you want to explain the speed components of social networks, Process on the Fly will help show how external speed gets translated internally, or make use of real time data availability with the help of Thriving on Data. You can also find inspiration in the Balance by Design principle, What's our Story, which prescribes that each application should tell an attractive story.

Who's it for?

Anybody with the will to tell a technology story. A working knowledge of TechnoVision is needed and can be acquired by practicing the development of stories.

Preparation

A thorough scripting is needed to give the story structure and avoiding getting bogged down into anecdotal details.

The Format

Monologue is feasible, but all forms of dialogue and conversation help with the actual understanding through participation.

Using the TechnoVision boxes is a proven way to make the content more alluring and tangible.

Grab a Box

Get an ultra-fast benefit from TechnoVision in just a few minutes. Create a long-lasting memory (if nothing else) through a picture. Acquire your first taste of working with TechnoVision. Have a quick icebreaker between workshop sessions.

Who's it for?

For anyone, including people that happen to be visiting an innovation center or office space that feature the boxes.

Preparation

Make sure you have the 'wall' of TechnoVision building boxes set up.

The format

Don't explain TechnoVision. Just ask all participants to have a brief look at the 'wall' of TechnoVision building blocks and choose a box that – on its title alone – intuitively matches their interests or ambitions. Ask every participant to give an elevator pitch on why they selected this particular box and if applicable, what personal next step they assign to it. Take a picture of every individual showing their box. Finally, take a group picture. Distribute to all participants for later reference.

Applying **TechnoVision Virtually**

As we've mentioned before, in general, we prefer to apply TechnoVision in a lively workshop setting. However, as times have changed over the last year, so has our approach to Applying TechnoVision in a virtual context. So, while there is no real substitute for human contact, the nature of TechnoVision means it can be applied in any physical, digital or even phygital setting.

TechnoVision is typically applied according to the following steps: the team is introduced to the different containers and trends mentioned in the report; business challenges are described; selected components are studied and discussed, either individually or in groups; storylines are crafted; finally, the findings are reported out. These steps can all be achieved using virtual tools.

Web conferencing software – including Webex, Zoom or Microsoft Teams – can be used for most of the presenting duties, such as introducing the business challenge, educating the attendees on key TechnoVision components, and the final reporting out.

Online group discussions can also be organized with collaborative brainstorming and ideation tools, such as Stormz, Klaxoon and Mural. Some can be preconfigured with TechnoVision components (for example as Kanban-style "cards") to get a team kick-started.

All TechnoVision components are publicly available online, and we invite everybody to set up their own virtual TechnoVision co-creation environment. Alternatively, we have found that a set of Microsoft PowerPoint (or similar application) templates and pre-filled slides can do the job well. The advantage of using these tools is that most people are very familiar with them. Moreover, many cloud-based environments allow teams to work together on the same document or slide concurrently, which makes collaboration straightforward.

Equally, one of the team members can be in presentation mode on the web conferencing tool and build up the slides (for example a 'technology story', consisting of several selected TechnoVision components) while discussing with – and guided by – the other team members. We have found that – generally speaking – the more tailored the materials, the more successful the virtual session is likely to be.

Of course, some methods of applying TechnoVision – such as creating a 'digital picture' or shaping parts of a to-be architecture – are more offline by nature, and may take days, weeks or even months. Even then, there may be a cadence of offline activities – such as desk research and requirements gathering – and online report-out and feedback sessions. As a matter of fact, we are already finding that the virtual ways of working, with less constraints on unity of location or time, also enable innovation 'workshop sessions' to take longer than the typical few hours; for example spread out throughout a week with short online sessions, combined with offline work and collaboration.

And for those who really can't imagine applying TechnoVision without manipulating and stacking these fabulous, colorful boxes, some of our Applied Innovation Exchange labs have been known to play around with 3D boxes on TechnoVision 'islands', all in virtual reality.

#TweetMyArchitecture

It's a tall order for IT and Enterprise architects to balance the paramount, crazy complexity of changing technology and systems with the need to create a calm oasis of simplicity on top of it. And even if they manage to do so, they need to explain their architectures in a way that creates trust and just enough insight – plus lots of enthusiasm – for all involved to embrace and adopt it.

Following up with architectural perspectives on an inspiring TechnoVision workshop (or even during a workshop) is a matter of keeping the same playful, explorative state of mind. For years, we have known that huge, multi-layered schematic diagrams are not fit for this purpose – other than as a secret language among architects themselves. Maybe we could try to resort more to what currently turns out to be the most powerful communication tool available: the 140-character tweet. If you can't tweet it, it won't cut it.

We have been experimenting for some time now with a training workshop format, to which we call 'Tweet My Architecture': bringing back the essence of an Enterprise or IT architecture to tweet level and then taking no more than 30 seconds on a soapbox – possibly during or at the end of a TechnoVision workshop - to explain the rationale behind it and win the audience over.

If nothing else, it is a humbling and refreshing learning experience to be at the tweet level. But it can be so much more than that, as we are delicately balancing simplicity, complexity and trust.

So, hashtag tweetmyarchitecture it is. We'd love to see a little wave of shared tweet architectures out there. When it comes down to it, what would your #tweetmyarchitecture statement look like?

A Few
More Things

As we noted in our introduction for this year's edition, we strive to make TechnoVision a relevant snapshot in time. It focuses on technology trends that are – or very soon may be – the movers and shakers of Technology Business. It provides input for vision, strategy, architecture, planning, innovation, or simply just for having a playful dialogue about what lies ahead.

However, the pandemic reminded us that there is a limit to our fortune telling abilities, no matter how great we think they are. Mike Tyson, considered by many in the same mythical league as Bruce Lee, once said it quite candidly, ***"Everybody has a plan. Until they get punched in the mouth."***

It makes us humble when we are trying to see what might be in store a little bit further down the line. Naturally, we're trying anyway.

There is still IT's own Schrödinger's Cat: quantum computing. To some a mindboggling break with everything we have learned and practiced so far in the industry, to others an intriguing, but unproven solution to problems that yet need to be identified. The TechnoVision core team prefers to see itself positioned somewhere in between these states – depending on the perspective, really. Practical experiences are in any case increasing, as are the number of qubits that can be contained in a computer.

Sensor-based, real-time responsive, AI-driven, autonomous systems as we see them, particularly emerge in the innovative areas of ***Intelligent Industry***, will no doubt have impact on other business domains as well. It's difficult to forecast when the first level 5, complete self-driving enterprise (humans optional) will have its entry in the stock exchange. But as a dot on the horizon, it surely stretches the imagination.

On this journey, we feel that our brand-new notion of ***StratOps*** (the DevOps way of continuously delivering on strategy within a Technology Business) becomes pivotal. As we discuss, execute and learn more about it, we will definitely keep you posted. Watch for our midyear 'TechnoVision Future Thinking' update, that very likely will bring you more.

The quickly rising powers of creative AI – whether in language, data, images, video, audio, marketing, R&D, life science, or art – appeal to the imagination. As long as we appreciate these powers are truly ***artificial*** – and hence should not be attributed human qualities – they will be the perfect augmentation to anybody looking to expand their creative expressions. As practitioners, we are also interested to see how creative AI can help us to shape strategies, find innovations build architects, even envision new business models.

In all cases, our fascination for what technology can achieve – the things it can do for us and can do instead of us – must not distract us from the fact that human energies should take center stage. Ethics and emotional intelligence are so more than support acts in orchestrating the right balance between man and machine.

2021 promises to be a transformative year. Even if these days it seems difficult to predict what will happen next week let alone next year, we like to think that many technology businesses will see a renaissance. One that will leverage the breakneck speed of innovation that all businesses have seen, that yet again – but now more successfully – focuses on its purpose, its corporate ***raison d'être.*** As an excellent, highly relevant report by the Capgemini Research Institute shows, AI provides many ways to drive climate action. And that is just one example.

There is an ocean of similar opportunities when it comes to the application of technology for a better and more sustainable, more inclusive world. Hopefully, TechnoVision inspires you to sail these waters, with, or without all hands on deck. ***Bon voyage!***

The TechnoVision Change Making **2021 Team**

Authors:
Ron Tolido and Gunnar Menzel, with Pierre Hessler

Editor in Chief:
Emma Hunter

Project & Marketing Manager:
Pratibha Sharma

Design and Graphics:
Somnath Sil, Saptadip Dey Sarkar, Pratik Kundu

Experts in Residence:
Ajith NC
Alexandre Embry
Andreas Sjostrom
Anne-Laure Thieullent
Bernd Wachter
Claudia Crummenerl
Cornelia Görs
Daniel Koopman
Dapo Adekola
Dave Laud
Desiree Fraser
Elle Sanchez Cardenas
Fabian Schladitz
Fiona Critchley
Gabi Ledesma
Gert Helsen
Gita Babaria
Isabell Schastok
Jessica Leitch
Jorge Villaverde
Judith Kennes
Lee Beardmore
Leon Smiers
Manuel Sevilla
Monika Gupta
Muhammed Ahmed
Mukesh Jain
Padmashree Shagrithaya
Patrice Duboë
Priya Ganesh
Rajashree Das
Robert Kingston
Smitha Gopalaiah
Sudhir Pai
Thilo Hermann

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BE LIKE WATER

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