Ushering in the Experience Economy

A transition from siloed products to end-to-end purpose-driven solutions to accelerate growth
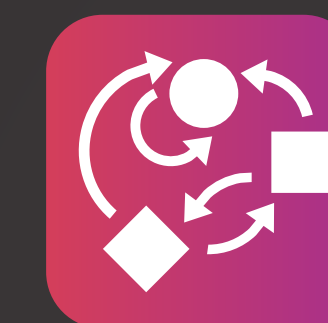
Technology Industry
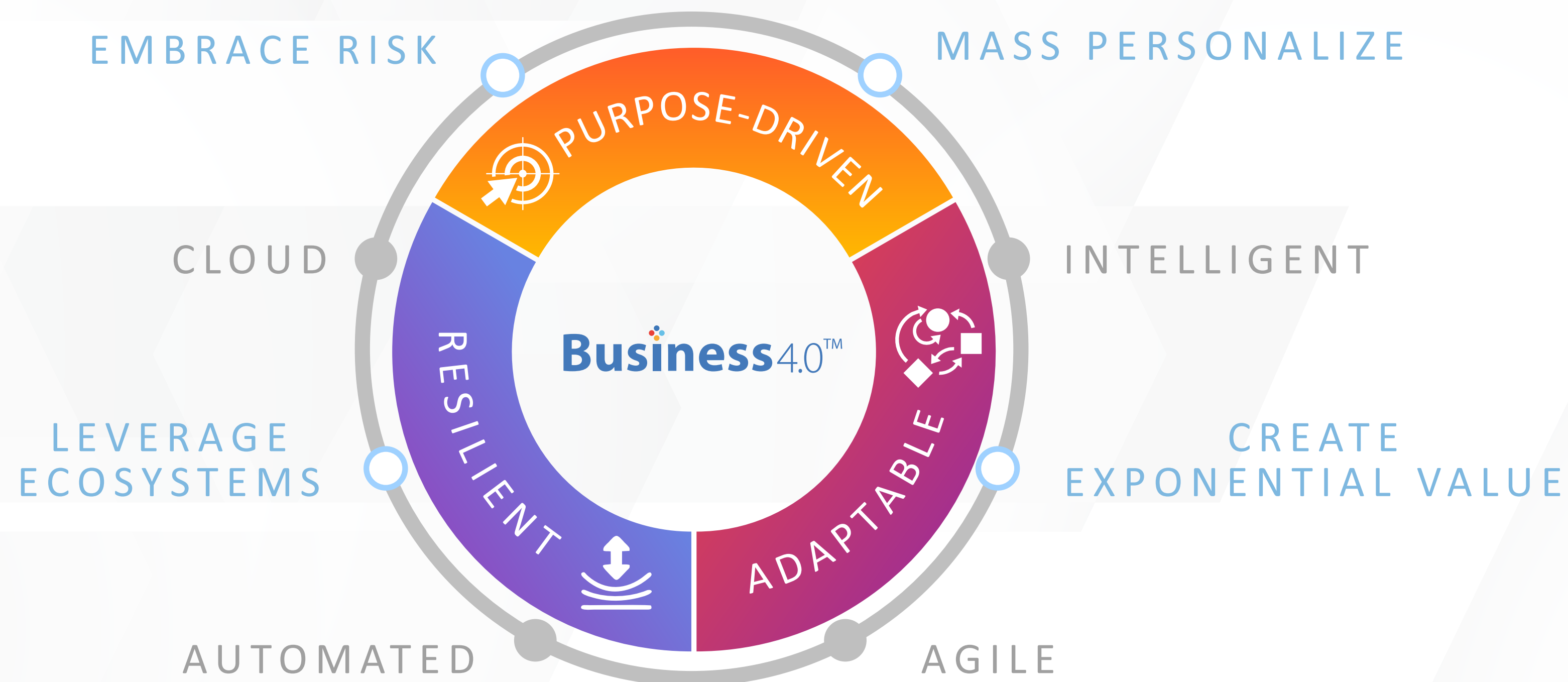
PURPOSE-DRIVEN RESILIENT ADAPTABLE

Executive Summary

Technology companies are at the forefront of innovation, creating products and solutions that enable digital transformation across different industries. They are ushering in the intelligent and connected world by creating smaller and more powerful chipsets, next-generation connectivity technologies such as 5G, and new and improved experiences through smart devices. Because of their diverse customer footprint and complex business dynamics at play, which results in cross-industry impact, technology companies are susceptible to significant volatility during crises such as the current pandemic.

Besides significantly changing consumer behavior and disrupting market dynamics, the lockdowns and social distancing have caused component shortages due to supply chain disruptions. This has impacted business operations across product engineering, sales, customer service, and manufacturing.

While there is no existing playbook to deal with this unprecedented change, we believe technology companies need to embrace the Business 4.0™ mindset by adopting digital interventions to bring resilience in the short term; building a digital core, simplifying, and creating web-scale platforms to bring agility and adaptability in the midterm; and finally, embracing the ecosystem to create an experience economy and achieve their purpose. This will position technology companies for success and help them survive and thrive in the post COVID-19 world.

PURPOSE-DRIVEN   RESILIENT   ADAPTABLE

Current Market Dynamics of the Technology Industry

As illustrated in Figure 1, technology companies will see changes across multiple aspects of their business.

To understand the impact of the pandemic on technology companies, let us examine the carrier network space. Firms here will experience a slowdown in 5G network deployments due to supply chain disruptions and lockdowns in the near term. The demand for higher speed, higher bandwidth, low latency, massive machine type communication, and edge computing will drive the next wave of digital transformation across industry verticals and will result in the rise of smart campuses, lights-off factories, remote healthcare, and over-the-top (OTT) media services. As a result of this, we see 5G deployments picking up in the long term, notwithstanding short-term setbacks.

The growth of enterprise network companies will come under pressure due to reduced capital expenditure investments. However, some segments such as collaboration products, virtual private networking (VPN), firewalls, virtual desktop infrastructure (VDI), and cybersecurity products for secure access will see high growth, as enterprises encourage remote working. Web-scale routers and switches will have higher demand as companies will adopt the cloud for enterprise and end-customer workloads to improve resiliency and scale.

The semiconductor electronics market will have significant degrowth due to the downturn in the automotive, aerospace, power, and energy industries. The slowing demand for consumer electronics such as smartphones, smartwatches, and televisions will in turn result in reduced demand for connectivity, application processors, and modem chipsets. Automation and remote operations will drive semiconductor growth in artificial intelligence (AI) hardware accelerators, augmented and virtual reality (AR/VR) devices, drones, and robotics. Consumption in medical electronics related to COVID-19, such as ventilators and diagnostic tools, will see steep growth. The demand for network processors will follow the needs of the carrier and enterprise

DISRUPTED PRODUCT INNOVATION	■ Disruption in product engineering & innovation activities ■ Configuration and deployment challenges
VOLATILE SALES	■ Cutbacks on discretionary spending ■ Immobilized field sales and marketing ■ Lead fallouts and insufficient lead generation
SUPPLY CHAIN DISRUPTION	■ Skewed demand and supply resulting in overstocking or shortage ■ Disruption in manufacturing and supply chain operations
FINANCIAL IMPACT	■ Working capital stress ■ Anti-dumping margin stress ■ Cashflow volatility
WORKPLACE LOCKDOWNS	■ Productivity impact – Communication and collaboration ■ Elevated IP, data, and security risk
DISTRESSED CUSTOMER SERVICE	■ Impacted field services ■ Risk to SLAs and contractual commitments ■ Continue to deliver the CX promise

Figure 1: Impact of COVID-19 on technology companies

network industries and will grow as 5G and cloud network deployments pick up.

While COVID-19 has introduced a new set of challenges that alter market dynamics, the crisis has also presented companies with unique opportunities. Though the short-term focus of technology companies should be on business continuity and crisis management, they should also accelerate the transformation of their products, services, and business models with a view to developing new and differentiated experiences, thereby creating a sustainable competitive edge.

We believe that technology companies should focus on the following aspects (see Figure 2) to navigate this crisis and accelerate their growth and transformation journey:

I

INTELLIGENT products and solutions for a servitized world

- Web-Scale On-Demand Solutions
- Next-Generation Compute Platforms for the Edge and Cloud
- Borderless Product Development
- BizDevSecOps Way of Working
- AI-Led Product Life Cycle Innovation

C

Strong digital CORE to bring in agility and adaptability

- Resilient Supply Chain
- Future-Proof IT to Align with Changing Business Models
- Reimagine Business Operations with MFDM™
- Next-Generation Data Architectures on the Cloud

E

Leverage ECOSYSTEMS for purpose-driven solutions

- On-Demand, Highly Customizable, End-to-End Solutions Leveraging Ecosystem Partners
- Collaborate, Co-Create, and Co-Sell Product and Services through Digital Platforms
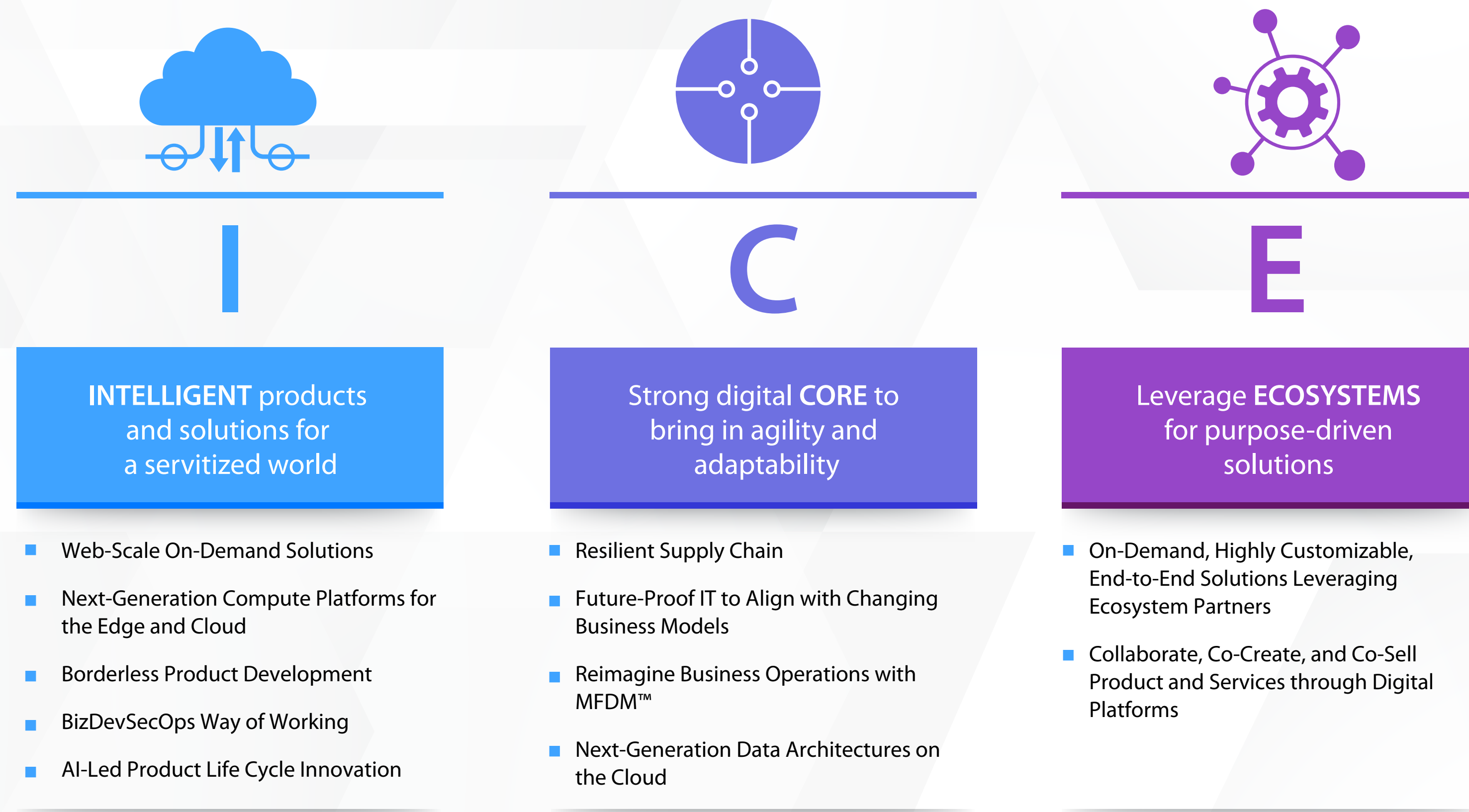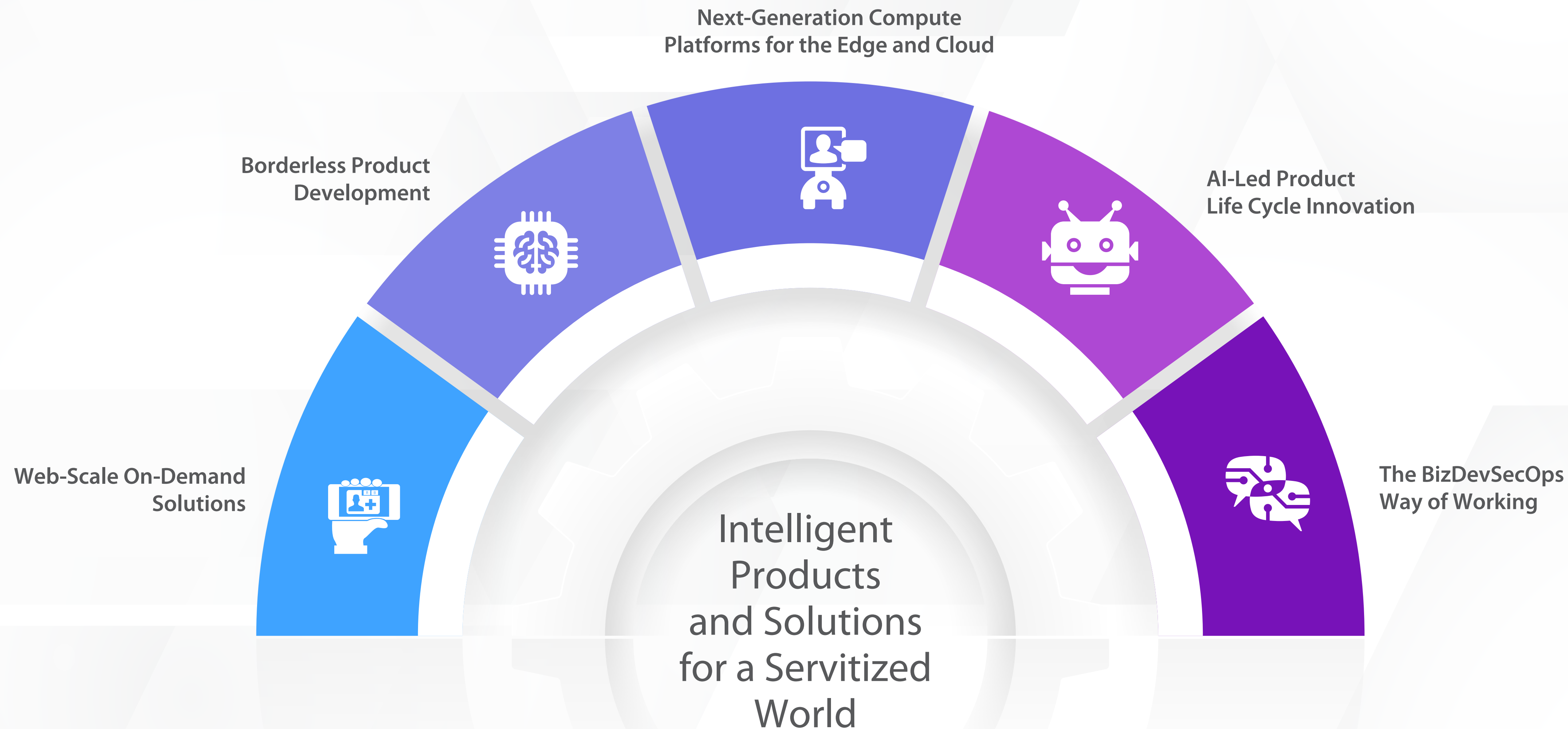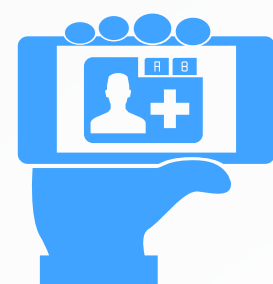
Figure 2: ICE – A response strategy for technology companies

Intelligent Products and Solutions for a Servitized World

- Web-Scale On-Demand Solutions
- Borderless Product Development
- Next-Generation Compute Platforms for the Edge and Cloud
- AI-Led Product Life Cycle Innovation
- The BizDevSecOps Way of Working

TATA CONSULTANCY SERVICES

Intelligent Products and Solutions for a Servitized World

Web-Scale On-Demand Solutions

The mobile phone era has changed the behavior of consumers, who now look for anytime, anywhere access to products. This in turn is driving more and more companies across industry verticals to transition to asset light and on-demand models for consuming products and services. The current crisis is drastically accelerating the digital transformation roadmap of companies across verticals while also increasing their reluctance to adopt any capex-intensive models. To respond to this changing consumption pattern, technology companies in turn need to accelerate their transformation from being hardware centric to digital transformation companies, offering end-to-end solutions on the cloud. They need to re-architect networking, computing and storage equipment, contact centers, security, and collaboration products to embrace a cloud-native approach and as-a-service model. Further, as technology companies need to cater to global demand, they need to make these products web scale and provide them in an intelligent and touchless manner to respond with agility in line with changing customer demands. In summary, the products need to become software centric, optimized for general-purpose hardware, support open standards, and be available on the cloud.
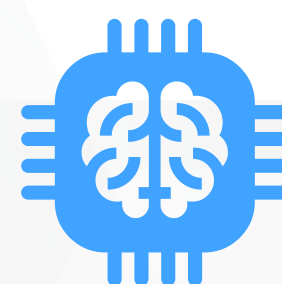
Borderless Product Development

Technology companies are constantly under pressure to accelerate product innovation resulting in a need to shorten product release cycles. R&D infrastructure is siloed by product lines, geographies, and distributed across multiple regional data centers. R&D environment configurations are complex and require extensive manual interventions which impede product innovation. They also tend to be capex intensive and result in low utilization due to lack of centralized resource management. In a scenario where workplace collaboration is being reimagined entirely, the current crisis is serving as a catalyst for R&D organizations to develop on-demand engineering environment-as-a-service to maximize the utilization of lab equipment, rationalize R&D investments, lower infrastructure footprint, and reduce operations cost, all while drastically reducing the turnaround time for provisioning environments. This will help them sustain the pace of innovation in a scenario where it is not always viable to have physical proximity or manual intervention in managing engineering resources.
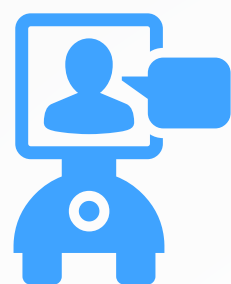
Next-Generation Compute Platforms for the Edge and Cloud

Companies across industry verticals will need to accelerate their AI adoption across products, services, and business operations in the post COVID-19 world. They will need to adopt AI with a view to enabling in-process intelligence and autonomous operations which will be key imperatives in the post-pandemic world. These solutions can sense, understand, decide, and act autonomously to improve business agility and customer experience. For instance, the retail industry will focus on enabling no-touch customer interactions in the store and implementing intelligent store operations that will process complex data, including in-store image and video streams. Retailers will also ensure safety and security while elevating operational agility and improving customer experience. Similarly, the evolution and ubiquity of technology firms coupled with the changing market dynamics will accelerate the adoption of smart solutions in other areas such as smart cities, smart workplaces, smart factories, and smart retail, thus driving the need for intelligent edge.

On the other hand, as healthcare and pharmaceutical companies strive to cope with the crisis and find a vaccine and medication for COVID-19, use cases such as drug discovery, genomics sequencing, and medical imaging will drive the need for next-generation high performance computing (HPC) to rapidly process such complex workloads on the cloud. Thus, there will be a spurt of AI solutions, both at the edge and on the cloud.

To meet the demand for AI solutions, semiconductor companies have been focusing on creating next-generation processors such as GPUs, HPC processors, FPGA, and AI hardware accelerators for the edge and cloud. There are several AI libraries and frameworks that are available as part of open source initiatives, which have become mainstream in the development of AI solutions. The true power of the new hardware platforms can be realized only when these libraries and frameworks are ported and optimized for them. In addition, creating an ecosystem of academia, startups, developer forums, and open source communities is critical for the rapid adoption of these new technologies. Hence, to make AI pervasive, semiconductor companies need to adopt a comprehensive approach that combines creating best-in-class processors with optimization of AI libraries and frameworks that creates an ecosystem that propels adoption.

The BizDevSecOps Way of Working

To deliver value to customers, product teams must work together in alignment to bring innovations faster to market. In the current scenario of the pandemic, changing market dynamics are forcing technology companies to reimagine products and solutions to capitalize on opportunities and stay ahead of the competition. There is also pressure to increase feature velocity to cater to customer and market demand. To address this, technology companies are adopting BizDevSecOps to align their processes, technology, and tools across business, product engineering, security, and IT teams and bringing in a comprehensive automation approach across the entire ideate to deploy life cycle.

Modern-day smart solutions offered by technology companies are a combination of next-generation hardware, open-source software, purpose-driven programming tools, embedded engineering, AI, and industry consortium-driven standards across multiple products, all of which are organically developed or acquired. Very often, disparate tools and frameworks are utilized across different product teams that constitute a service

and within various teams working on a single product. In an environment such as this, deploying integrated processes and platforms across the life cycle of these products and services will synergize how teams work. To achieve this, organizations are building custom tools, platforms, and frameworks that enable integrated planning, collaborative development and accelerated test and deployment, and automated operations. This will also synergize product roadmaps across different teams to accelerate the introduction of innovative solutions to the market.
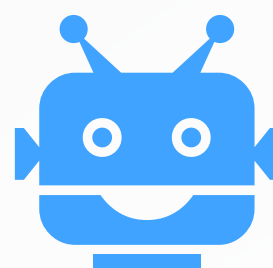
AI-Led Product Life Cycle Innovation

The current crisis has made it imperative, more than ever, for technology companies to balance short-term and long-term priorities. On one hand, technology companies are under pressure to shorten release cycles of products and continuously add new features in line with market and customer expectations. On the other hand, they need to ensure that they reduce the turnaround time for fixing customer-reported defects and ensuring customer satisfaction. This results in a need to improve feature velocity and shorten regression test times.

To achieve this, technology companies should adopt AI in R&D activities to improve productivity and product quality. There are several leading edge open-source AI solutions available to assist product development teams with activities such as bug triaging and root cause analysis, neural code search, code review tools to automatically detect bugs, tracing impacted area of code from test logs, and automatic regression test case identification.

Adopting AI will bring agility across the product life cycle and enable development teams to respond faster to field reported issues. They can identify the root cause quickly and provide resolutions confidently without introducing new defects that would impact product quality, thereby improving customer experience.

# A Strong Digital Core for Agility and Adaptability
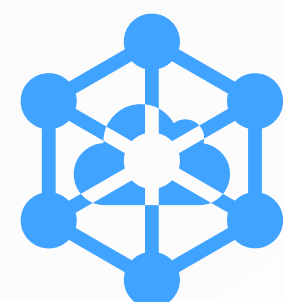
Resilient Supply Chain

In a crisis such as COVID-19, the ability to react rapidly is crucial for technology companies to secure supply, contract manufacturing, and logistics operations from disruptions and stay ahead of the competition. The key to achieving this is by systematizing and codifying risk management processes. This approach should empower technology companies to play the role of an orchestrator with comprehensive real-time visibility on availability, capacity, and capability of contract manufacturing sites, component suppliers, third-party logistics, and warehousing partners. The platform should enable business risk monitoring teams to visually analyze impacts to the supply chain, quantify the impact by product line, simulate and weigh various options, and rapidly initiate strategies for business continuity.

Reimagining Business Operations with MFDM™

Now, more than ever, technology companies need to adopt a 'Machine First' approach to operations across the value chain, as the volume of non-standard transactions increases exponentially due to the channel shift. The traditional shared services model needs significant human intervention to perform conditionally complex business-to-business (B2B) functions, including demand planning, procurement services, order processing, logistics, and financial settlements. The key to bringing adaptability to the operations beyond the immediate crisis is to build a B2B system, powered by automation technologies, which can orchestrate the complex B2B operations by imitating a shared services team. The system should emulate human-like behavior to collect information from the ecosystem, intelligently validate the diverse sets of inputs and then process the transaction across IT systems to achieve end-to-end process automation, instead of just providing a point automation solution. This will bring agility and resiliency into business operations.
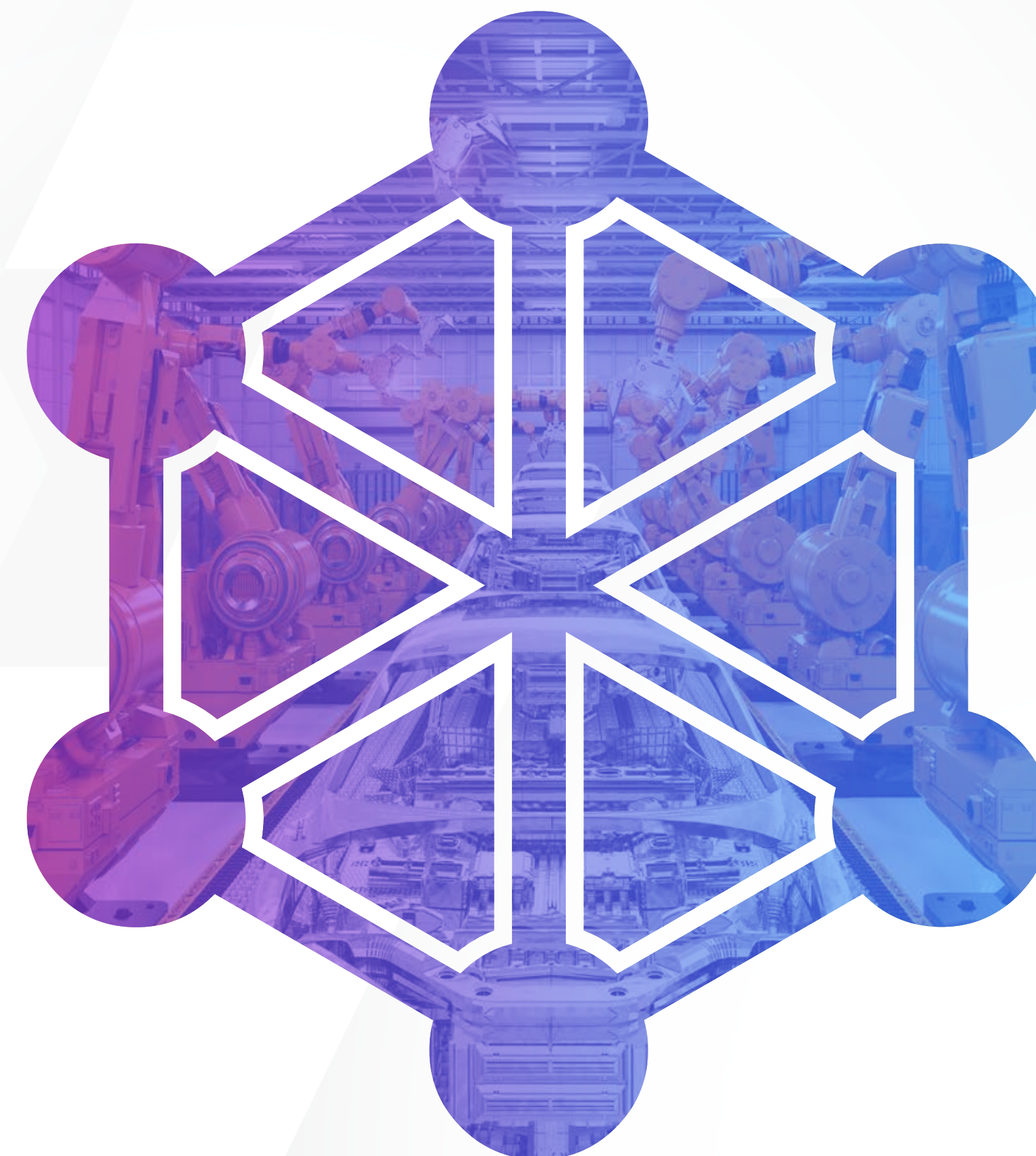
Future-Proof IT to Align with Changing Business Models

Technology companies should have the ability to swiftly and confidently adapt to the changing business and technology landscape and be the leader in ushering in new changes to the industry. They need to have processes and systems to sell and deliver hardware, software, and services bundles, and support newer business models such as as-a-service and subscriptions. In addition, they need to support the shift towards direct sales channels instead of indirect sales channels to forge long-term relationships with customers. This requires them to reimagine customer engagement across the life cycle and put in place mechanisms to deal with the increasing transaction volumes associated with the shifting channel strategy. They can do this by simplifying and standardizing processes across the value chain to improve business velocity and adopting software-as-a-service (SaaS) solutions that combine industry processes with the latest in cloud technology.

Further, the availability of subject matter experts (SMEs) during a crisis such as the ongoing pandemic is in short supply. SMEs possess significant product and domain knowledge in every step of the purchase process and can configure and suggest solutions to assist customers and partners. Digital e-commerce coupled with guided configure price quote (CPQ) platforms and intelligent recommendation engines can address this shortage. Such an intelligent commerce solution will help technology companies provide their customers a unified experience in a low-touch manner.

Next-Generation Data Architectures on the Cloud

Technology companies that harness the power of data for real-time actionable insights and to create new revenue streams gain a sustainable competitive edge as we emerge from this crisis. Firms can generate actionable insights by investing in future-proof data architectures that use advanced analytics and AI on the cloud. This will help firms gain intelligence in areas such as customer behavior, lead generation, demand forecasting, inventory planning and optimization, manufacturing, and more, which will improve a firm's top and bottom line.

For instance, the manufacturing quality assurance process is highly labor-intensive, expert-dependent, and error-prone. This process includes anomaly detection, defect correlation, and predictive maintenance, which are key to achieving optimal yield and profitability. Restrictions and the unavailability of the workforce due to COVID-19 has impacted the manufacturing throughput of many semiconductor companies. Technology firms should leverage next-generation data platforms to process the large amount of data from manufacturing

processes and leverage AI to mimic human experts for defect identification classification and root cause analysis. Automation will minimize disruptions due to the labor shortage and will help companies improve resiliency in the manufacturing quality inspection process while ensuring higher level accuracy in defect detection.

Leveraging Ecosystems for Purpose-Driven Solutions

As part of their digital transformation journey, companies need to look beyond the products they make and focus on creating new experiences for their customers in an intelligent and connected world. This will become a strong driver of how companies reimagine themselves, and going forward, will determine how they define their purpose.

Technology companies need to create on-demand, highly customizable, and end-to-end solutions by orchestrating services across the ecosystem. Beyond just partnering together to create joint solutions, firms must leverage ecosystems to collaborate, co-create, and co-sell products and services across the design-to-deploy life cycle. Collaboration will take place not only among networking technology and semiconductor companies, device manufacturers, and communication services providers but also among players outside the traditional technology ecosystem such as medical device manufacturers and vehicle manufacturers. These firms will come together to offer their customers end-to-end solutions and differentiated experiences.

A hyper-connected ecosystem enabled through digital platforms will accelerate their innovation and help them deliver exponential value to customers.

Conclusion

While the Coronavirus pandemic will impact industries in an unprecedented manner, it also offers technology companies new opportunities to reinvent themselves and accelerate their transformation, besides playing a key role in the digital transformation of their customers.

The current situation will make technology companies introspect about what is most critical for them and what their true sources of value are. A Business 4.0 mindset will serve as a beacon guiding them on their digital transformation journeys, as they focus on accelerating product innovation, embracing new business models, and delivering mass personalization to their customers.

About the **Author**

V Rajanna is a multi-faceted leader with two and a half decades of experience of spearheading growth and transformation for customers in the technology industry. He is currently Senior Vice President and heads the Technology Business Unit in Tata Consultancy Services (TCS). Rajanna developed a strong software product engineering practice to help technology customers accelerate their servitization journey and realize the promise of an intelligent and connected world.

Prior to his current role, Rajanna led the Telecom OEM Business Unit at TCS, where he built multiple strategic partnerships with customers to accelerate their product innovation. As the General Manager (GM) for Delivery and Operations in the Asia Pacific region, he set up the regional delivery organization and spearheaded the integration of Global Delivery Centers of TCS. He was the first Chief Executive Officer of TCS in China. Rajanna adeptly led various state industry bodies including the Confederation of Indian Industry (CII), and has been very active in the formulation of policy frameworks.

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