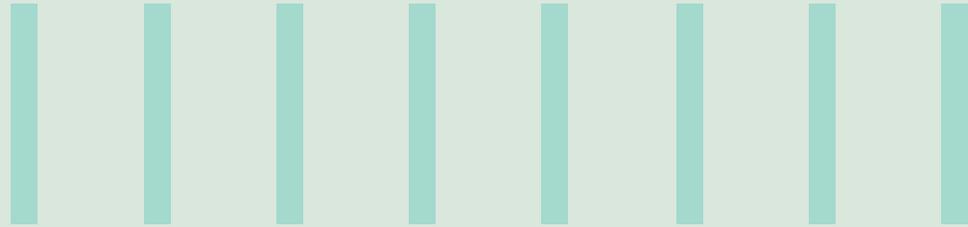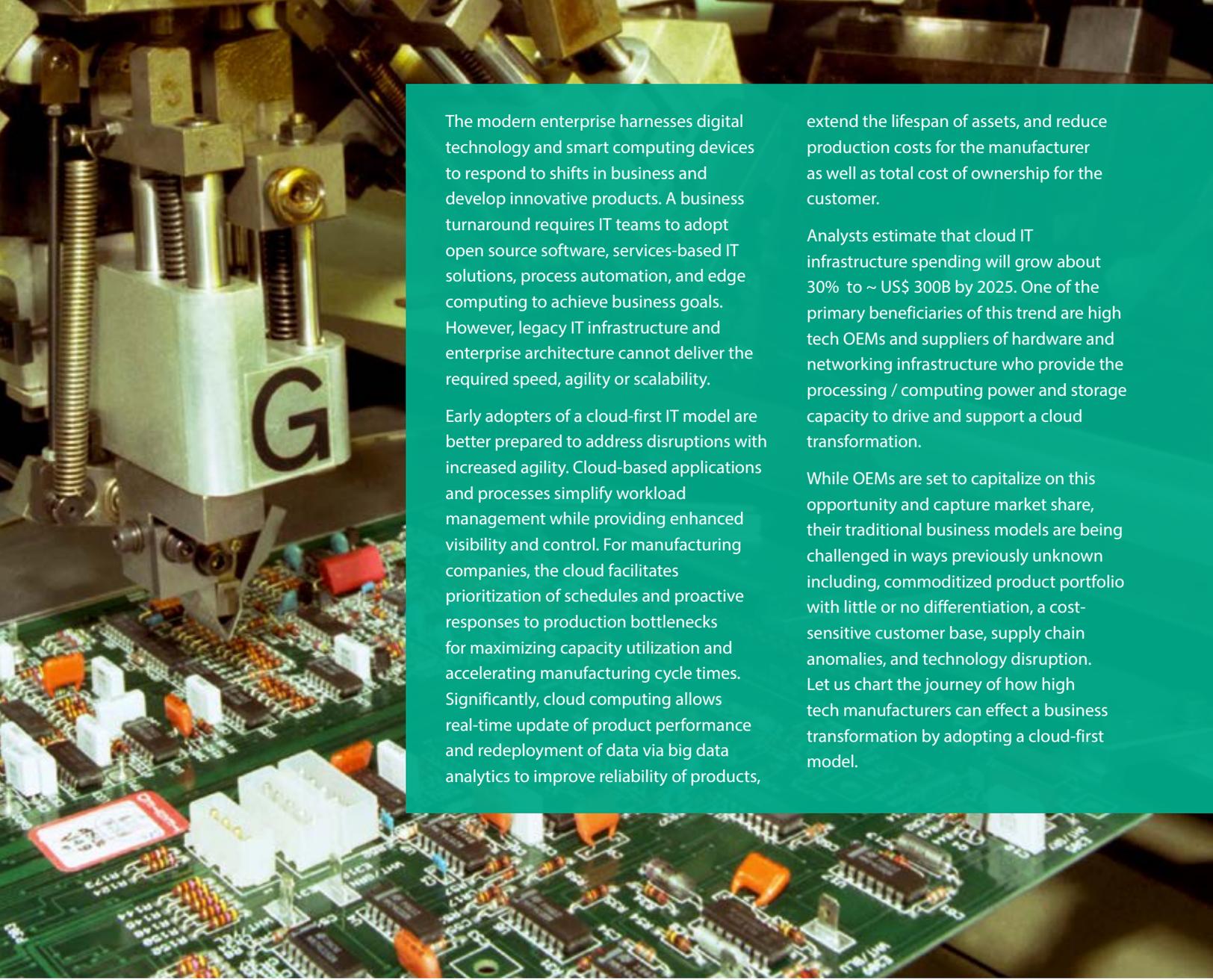# THE CLOUD IMPERATIVE FOR HIGH TECHNOLOGY MANUFACTURERS

How IT infrastructure providers can support a cloud-enabled product portfolio and agile business processes

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The modern enterprise harnesses digital technology and smart computing devices to respond to shifts in business and develop innovative products. A business turnaround requires IT teams to adopt open source software, services-based IT solutions, process automation, and edge computing to achieve business goals. However, legacy IT infrastructure and enterprise architecture cannot deliver the required speed, agility or scalability.

Early adopters of a cloud-first IT model are better prepared to address disruptions with increased agility. Cloud-based applications and processes simplify workload management while providing enhanced visibility and control. For manufacturing companies, the cloud facilitates prioritization of schedules and proactive responses to production bottlenecks for maximizing capacity utilization and accelerating manufacturing cycle times. Significantly, cloud computing allows real-time update of product performance and redeployment of data via big data analytics to improve reliability of products,

extend the lifespan of assets, and reduce production costs for the manufacturer as well as total cost of ownership for the customer.

Analysts estimate that cloud IT infrastructure spending will grow about 30% to ~ US$ 300B by 2025. One of the primary beneficiaries of this trend are high tech OEMs and suppliers of hardware and networking infrastructure who provide the processing / computing power and storage capacity to drive and support a cloud transformation.

While OEMs are set to capitalize on this opportunity and capture market share, their traditional business models are being challenged in ways previously unknown including, commoditized product portfolio with little or no differentiation, a cost-sensitive customer base, supply chain anomalies, and technology disruption. Let us chart the journey of how high tech manufacturers can effect a business transformation by adopting a cloud-first model.

Making products smarter!

Differentiating highly commoditized compute and storage products is a perennial challenge. High technology OEMs are addressing it by developing self-healing infrastructure to preempt issues, maximize availability, and maintain optimal performance. Appliances need to be designed for easy installation and management in distributed environments. Further, systems administrators can monitor performance, undertake real-time analysis, and troubleshoot in advance.

Pre-engineered servers, storage, networking, and other hardware products are based on open standards to provide interoperability, edge capabilities

and granular programmability. The products support integration of modular functionality, software-defined platforms, remote performance turning, and rapid expansion of processing and storage requirements of businesses across industries. These capabilities empower IT teams to integrate compute, network and storage resources for cost-effective centralized management.

OEMs are further enhancing value via cloud-agnostic 'intelligent' hardware that supports over-the-air product / systems update, Internet of Things (IoT) devices, and Industrial IoT applications. Use cases range from products to track assets and

monitor greenhouse gas emissions to automatically regulate centralized Heating, Ventilation and Air Conditioning (HVAC) systems. Further, cloud-based security solutions integrated with products mitigate risks in the event of data breaches.

Cloud-managed products can be monitored for visibility into performance, availability and security from remote operation centers. It helps global enterprises easily manage a high technology product portfolio in a heterogeneous landscape. Notably, smart IT appliances ensure business continuity and reinforce support services.

From smart products to a superior customer experience.

In a hyper-competitive and cost-sensitive industry, customer experience is emerging as a key differentiator. High technology OEMs operating in a commoditized industry are amplifying the 'smart quotient' of products by offering omnichannel customer service. AI-powered chatbots, voice-enabled virtual assistants, mobile apps, instant messaging platforms, click-to-call solutions, social media, and online forums deliver instant technical services and a superior customer experience.

Cloud solutions integrate siloed product support channels in a manufacturing enterprise. An integrated ecosystem facilitates data sharing and collaboration, which results in accelerated turnaround time, more accurate issue resolution, and a consistent experience across technical support and customer service channels.

Smart high technology products share real-time data such as usage, performance, power consumption, downtime, and log statistics. Visualization dashboards provide a comprehensive view of products and help OEMs aggregate data across global deployments to create product-specific libraries. Big data analytics transforms the libraries into product improvement systems by capitalizing on contextual business insights.

Prescriptive, descriptive and predictive analytical solutions hosted on public, private or hybrid cloud aggregate product data, which helps improve products as well as service standards. The data analytics payback adds up incrementally: prevent incidents, optimize mean time for preventive maintenance and upgrade, reset alert / warning thresholds for critical performance parameters, reduce equipment delivery times, and customize product services.

Immersive technology such as virtual reality engages customers deeply through the product journey. Cloud-based applications better validate newly introduced features and functionality of a product or its parts to customers.

Further, digital twins and VR resources help demonstrate proposed product enhancements to suppliers and contract manufacturers.
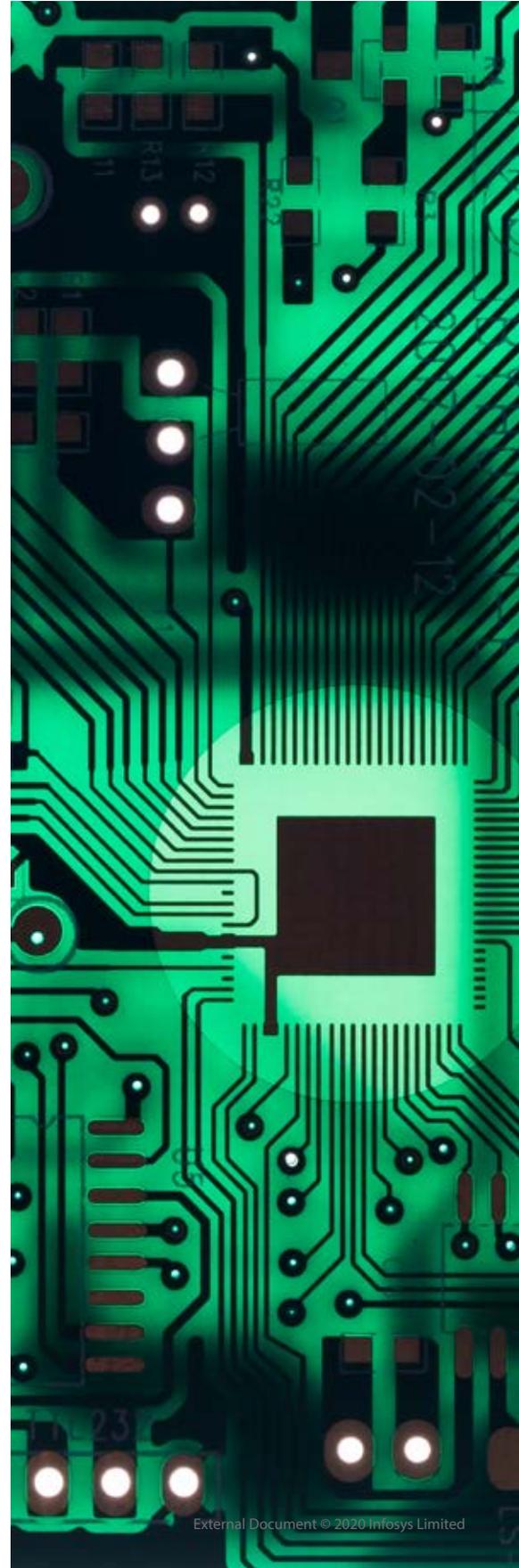
Transform the supply chain

The smooth flow of real-time data within the partner ecosystem is the glue for supply chain synchronicity. Abridged product lifecycles and rapid obsolescence that characterize the high technology and semiconductor industry add to supply chain complexity. End-to-end visibility - from research and development and the product pipeline to preventive maintenance systems - is an imperative, be it to launch a new product, fulfill same-day shipping orders, or upgrade equipment at a remote location.

A cloud-hosted supply chain platform offers a global ecosystem to streamline manufacturing and distribution of technology components. It integrates product developers, suppliers, contract manufacturers, and distributors, and thereby boosts the efficiency of warehouse, inventory and order management as well as transportation and logistics. A centralized platform helps the enterprise leverage global supplier networks and multi-modal logistics to serve a global clientele.

Optimizing a complex inventory of metals, minerals, chemicals, customized components, configured-to-order equipment, standardized finished products, and spare parts is a herculean task without a digital ecosystem. Machine learning and AI-based modeling ensure timely availability of inputs and accelerate time-to-market by identifying bottlenecks, facilitating dynamic route optimization for inbound and outbound logistics, and enabling real-time assembly line scheduling.

Cloud-based sourcing and supply chain management rationalizes operational and inventory costs, while simplifying complex bills of materials, ensuring scalability, improving quality, and mitigating risks. Moreover, it empowers supply chain managers to use predictive models and

AI tools to forecast and manage supply as well as demand. A cloud-based supply chain and logistics suite can be combined with big data analytics to maximize freight savings and reduce the carbon footprint of global operations.

Deliver environment-friendly products

High technology manufacturers face a dual sustainability challenge. On the one hand, the energy efficiency of microprocessors, electronic devices and hardware must be maximized to reduce power consumption and greenhouse gas emissions. On the other, fab and fabless enterprises need to adopt eco-friendly manufacturing practices for sustainable business growth.

While multicore microprocessors, embedded cooling, and chip-level cooling boost the efficiency of data centers, silicon microchip manufacturing needs to be continuously optimized since it determines the carbon footprint of electrical equipment and electronic devices. AI-based tools undertake lifecycle analysis of wafers, processors, and compute and storage products, and provide insights across the upstream and downstream supply chain - fabrication, assembly, usage, and disposal.

Lifecycle analyses help rationalize resource consumption and improve energy efficiency during production and across the product lifecycle. Moreover, it supports process improvements to maximize yield, minimize waste, and reduce water consumption as well as emissions. Valuable minerals and metals can be extracted and reused from scrap, products that fail testing, and retired / end-of-life products. For instance, precious metals, including

gold, silver, palladium, and copper, can be extracted and recycled from discarded mobile phones.

A huge amount of energy and toxic elements as well as intermediate compounds are used to convert quartz sand to electronic-grade silicon. The fabrication process also generates hazardous wastes, irrespective of the technology node or generation of the product. Semiconductor manufacturers either produce silicon wafers in their own foundries or procure it from third-parties. Cloud-based enterprise systems enable manufacturers to monitor operations in real time in both production models.

Automation of fabrication facilities helps standardize the process environment, which improves yield and reduces energy usage for each unit of production. Further, cloud-based Environment, Health and Safety (EHS) solutions enable fabrication plants to maintain safe working conditions, address sustainability issues, and comply with regulations.

High technology and semiconductor manufacturers should deliver hyper efficient microprocessors, integrated circuit chips, and high-end hardware products to boost digital enterprises. Cloud-based systems enable OEMs to respond to shifts in business and technology across the quartz sand-to-waste recycle chain.

About the Author

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Vineeth Gururaj is a seasoned Account Management professional with over 15 years' experience in the technology sector. As a Client Partner with Infosys, he is a trusted advisor to many industry executives, helping them navigate the complexities of enterprise IT, and achieve a technology-led transformation to deliver incremental business outcomes. Vineeth exudes a deep passion for innovations coming from the internet and cloud technology companies, and the power it gives people to achieve their true potential. He is also an active speaker at industry events and technology symposiums. You can reach Vineeth at Vineeth.Gururaj@infosys.com

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