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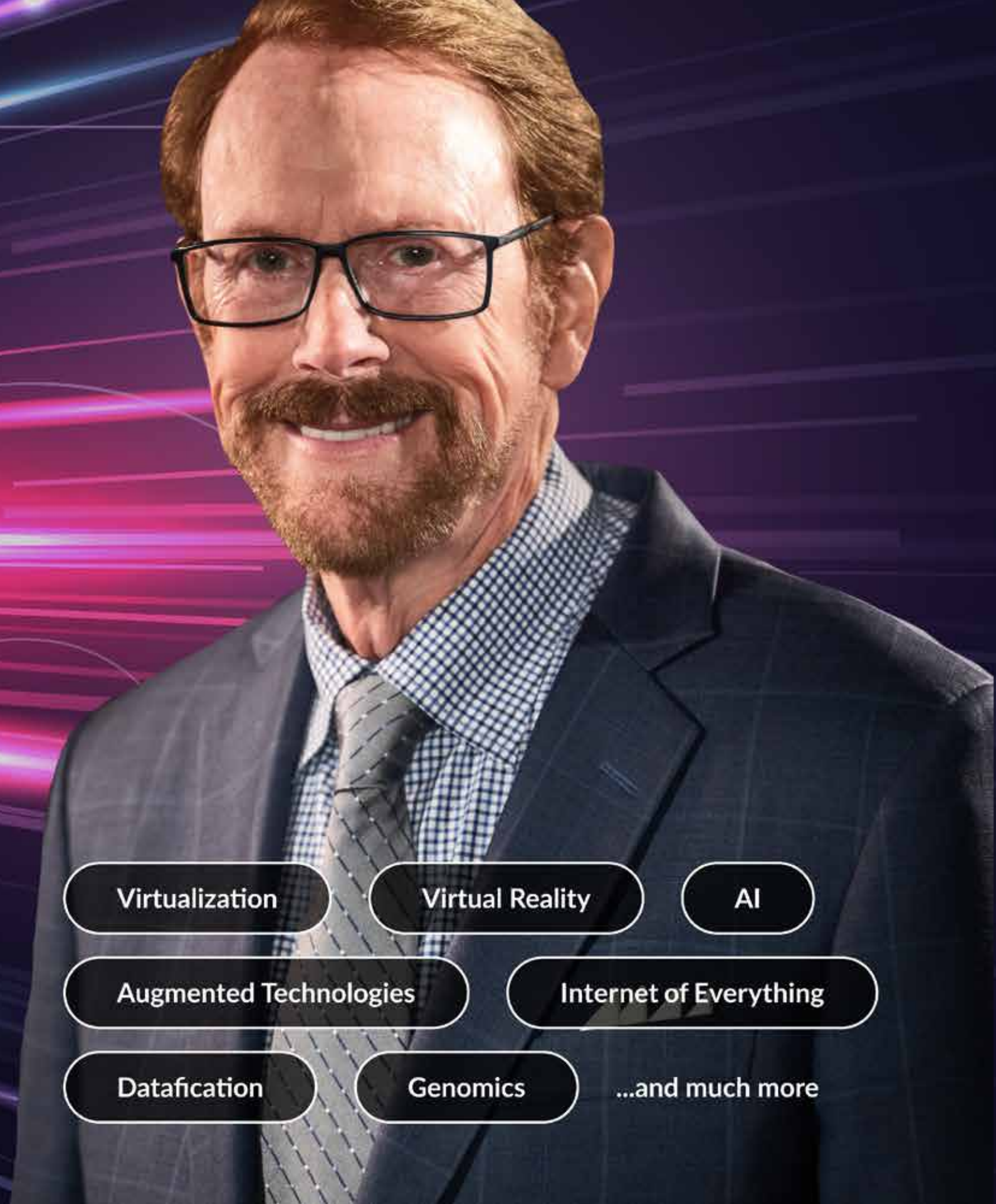
25

TECHNOLOGY HARD TRENDS SHAPING 2025…AND BEYOND

Virtualization

Virtual Reality

AI

Augmented Technologies

Internet of Everything

Datafication

Genomics

…and much more

Embrace Tomorrow's Certainties: A Definitive Guide to the Top 25 Technology Trends Set to Transform Your Future

In 1983, I became the first and only futurist to **accurately forecast 20 core technologies**—including AI, Distributed Computing, Nanotechnology, and Fiber Optics—that have since driven exponential change and value creation for decades.

Since then, I've remained **committed to trend forecasting**, authoring seven books and thousands of articles. My methodology, which differentiates between Hard Trends (*future certainties*) and Soft Trends (*possibilities*), is the backbone of this accuracy.

In today's world overflowing with trends, the real challenge is **identifying which will shape our future**. This Top 25 List is your **strategic compass**, helping you confidently invest where future outcomes are certain, and laying a strong foundation for game-changing decisions.

Exponential Growth Opportunities:

This list features trends that are **mature enough to catalyze exponential business growth**. Each one is on a path of rapid expansion, poised to deliver **transformative impacts** on both personal and professional aspects of our lives.

Game-Changing Opportunities:

Explore the **immense opportunities these trends unlock** across various applications and industries. This is more than just a list; it's a **strategic roadmap for those eager to embrace positive disruption** and harness transformative possibilities.

Hard Trends vs. Soft Trends:

Understanding the difference between **Hard Trends and Soft Trends is crucial**. Hard Trends are future certainties that shape our world, while Soft Trends are mere possibilities. This understanding equips you to make **strategic, informed decisions**, reducing uncertainty and enhancing planning.

Become a Positive Disruptor:

As you explore these trends, pinpoint specific ways to **harness their potential**. Embrace the chance to become a **positive disruptor in your field**, leveraging the transformative power of these certainties to drive innovation and achieve success.

Daniel Burrus

**Leading Technology Futurist,
Strategic Advisor,
& Disruptive Innovation Expert**
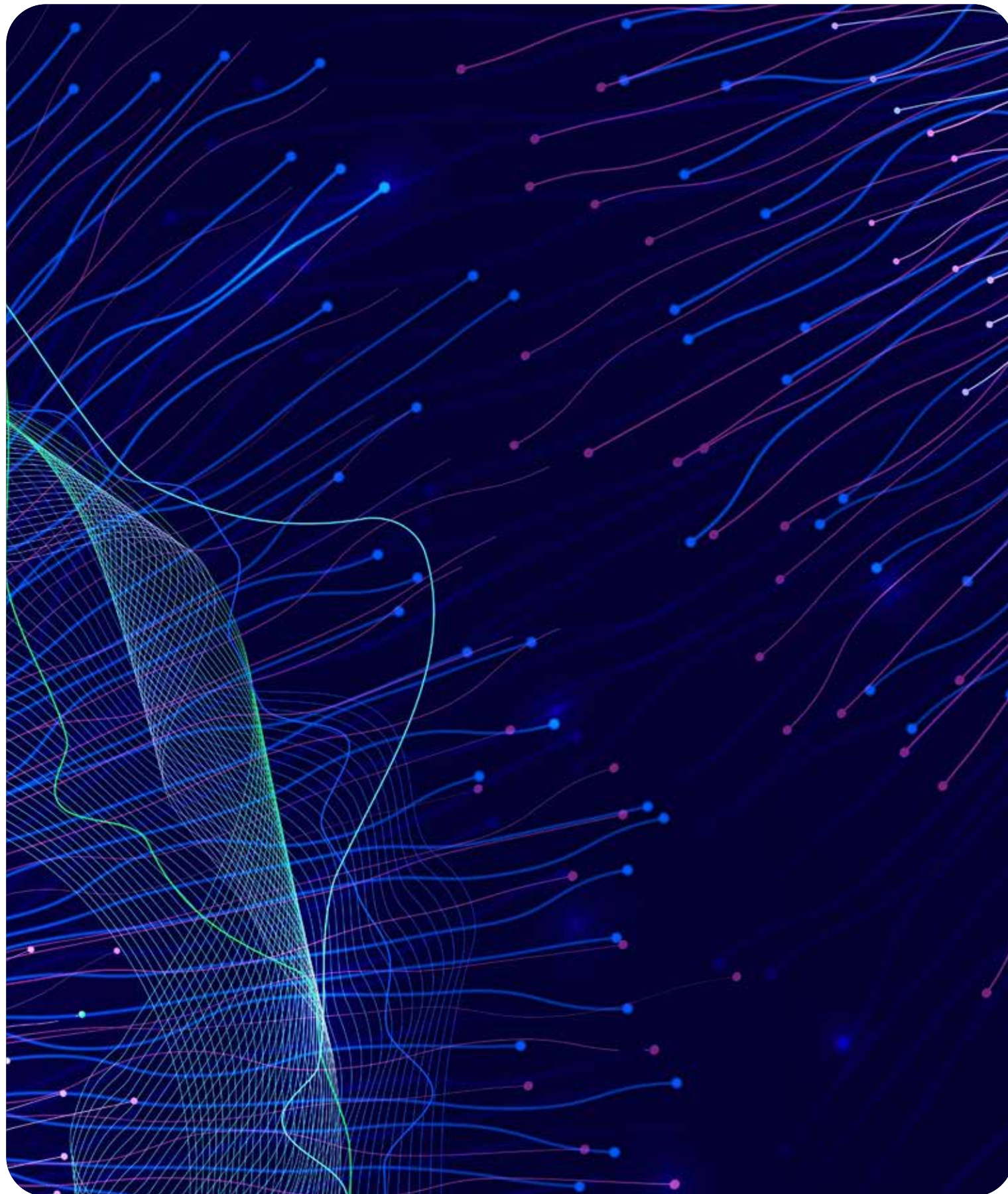
Unlock **Opportunities** and Drive **Innovation** in Your Industry

Discover **actionable steps to leverage the transformative power** of the Top 25 Tech Trends. From strategic planning to accelerated innovation, this guide offers a clear roadmap for immediate and impactful integration into your business.

Start your journey to success today.

Burrus Top 25 Technology Trends for 2025

1 **GENERATIVE AIs PRODUCTIVITY REVOLUTION**
Generative AI, from LLMs to Open-Source Models, will drive a productivity revolution and accelerate digital transformation across every industry.

2 **AI TRANSFORMING PROCESSES, PRODUCTS AND SERVICES**
Machine Learning, Deep Learning, and Generative AI will become increasingly integrated into all Processes, Products, and Services.

3 **AUGMENTED THINKING AND MOVEMENT**
AI advancements will accelerate Augmented Technologies like Augmented Thinking and Movement to new applications.

4 **SEMIAUTONOMOUS AND FULLY AUTONOMOUS TECHNOLOGIES**
Semiautonomous and Fully Autonomous Technologies will rapidly disrupt and transform multiple industries.

5 **ULTRA-INTELLIGENT ELECTRONIC AGENTS AND VOICE COMMERCE**
Generative AI and Wireless Broadband advancements are accelerating the use of Ultra-Intelligent Agents, Voice Commerce, and Interactive Voice Products.

6 **HIGH-SPEED STREAMING DATA ANALYTICS**
Datafication, powered by AI, IoT, and Edge Computing, will fuel AI-driven, High-Speed Streaming Data Analytics.

7 **AI DATA CENTERS AND DISTRIBUTED CLOUD PLATFORMS**
AI Data Centers, Distributed Cloud Platforms, and Generative AI will drive an accelerating digital transformation.

8 **HARDWARE AND SOFTWARE VIRTUALIZATION**
Hardware and Software Virtualization, from Storage to Networking, is rapidly increasing.

9 **AR, VR, MR AND DIGITAL TWINS**
Virtual Reality, Augmented Reality, Digital Twins will shift from rapid evolution to revolutionary applications.

10 **SOCIAL BUSINESS APPLICATIONS**
Social Business Apps are accelerating, using AI-driven Behavior Analytics and Personality Profiling to boost engagement and influence.

11 **EVERYTHING as-a-SERVICE (XaaS)**
Process and Service Virtualization is driving the expansion of "Everything as-a-Service" (XaaS).

12 **DATAFICATION OF EVERYTHING**
High-speed wireless from 5G/6G to Microsatellites will expand Global Networking, drive Datafication, and Democratize AI.

13 **INTERNET OF EVERYTHING**
IoT, Edge Computing, Advanced Cloud, Generative AI, and 5G/6G are rapidly converging to form the Internet of Everything (IoE).

14 **ADAPTIVE AND PREDICTIVE CYBERSECURITY**
Generative AI's rise is amplifying Cybersecurity challenges, driving Adaptive Systems and advanced employee cyber education.

Burrus Top 25 Technology Trends for 2025

15 **IDENTIFICATION AND VERIFICATION TECHNOLOGIES**
Adoption of Multi-Biometrics, Digital Keys, and Advanced Tokenization will rapidly increase.

16 **WEB 3 DECENTRALIZATION**
Industrial Blockchains will accelerate, while Cryptocurrency, Digital currency, and NFTs drive Web 3 decentralization.

17 **INTELLIGENT MOBILE DIGITAL PLATFORMS**
AI-powered Smartphones and Tablets, linked by 5G/6G and Microsatellites, will become key platforms for communication, collaboration, and innovation.

18 **AI-ENABLED ADVANCED MOBILE APPLICATIONS**
Advanced Mobile Apps, Web Apps, and Super Apps—powered by Generative AI will accelerate innovation in mobile applications.

19 **SMARTER MULTI-SENSORY WEARABLES**
Smart Wearables, equipped with Advanced Sensors, will increasingly provide personalized health monitoring and diagnosis, while also enhancing communication and collaboration capabilities.

20 **AI-ENABLED ROBOTICS AND ADVANCED AUTOMATION**
AI-enabled robotics and cobots are elevating robotic automation to new levels of capability.

21 **GENERATIVE AI TRANSFORMS DIGITAL LEARNING**
AI-Integrated, Tele-Education, Remote Instruction, Online Learning, and Gamified Training will Transform Learning.

22 **ADVANCED 3D PRINTING**
3D printing is shifting from rapid evolution to revolution, expanding applications across many industries.

23 **AUTONOMOUS AND SEMIAUTONOMOUS DRONES**
Drones are reaching new levels of capability with AI-enabled Autonomous and Semi-Autonomous integration accelerating advanced applications across industries.

24 **SUSTAINABILITY ELEVATED BY AI ACCELERATED RENEWABLE ENERGY**
Sustainability will rapidly advance, driven by innovations in Energy Storage, Microgrids, Renewables, Green Hydrogen, and Electric Vehicles.

25 **GENOMICS, SYNTHETIC BIOLOGY AND BIOMANUFACTURING**
Genomics, CRISPR Gene Editing, mRNA Technology, Synthetic Biology, and Biomanufacturing will rapidly grow.

Generative AI's impact will extend across sectors, reshaping how content is created, tasks are automated, and insights are generated. With capabilities spanning text, images, videos, audio, and even complex coding, these tools are increasingly transforming everything from content creation and coding to customer service and marketing.

Key drivers of this trend include:

- **Rapid multi-modal content generation will accelerate**, automating production of high-quality text, media, code, and much more.
- **Enhanced operational efficiency**: Optimizes workflows across departments like HR, sales, and support.
- **Boosted productivity and innovation**: Empowers professionals with "first draft" digital assistants to streamline work and solve problems creatively

On the Horizon:

- **Artificial General Intelligence** (**AGI**): While still emerging, AGI is expected to equal and go beyond human capabilities. Developing clear guidelines and safeguards now will be essential to mitigate risks and ensure responsible use.
- **Large Behavior Models** (**LBM**): Thanks to advances in Generative AI, advanced Vision Systems and Robotics, we will see the rise of Large Behavior Models that learn from behaviors on a global level that will rapidly advance robotic automation.

As the power and adoption rate of these technologies grows, clear guidelines and safeguards will be essential to mitigate risks and ensure responsible use, positioning Generative AI as a transformational force in the digital age.

1 GENERATIVE AIs PRODUCTIVITY REVOLUTION

The use of Generative AI including Large Language Models (LLM), Small Language Models (SLM), Open-Source AI Models, and an array of LLM-Powered Tools will grow at beyond exponential levels driving a productivity revolution and accelerating digital transformation across all industries.

2 AI TRANSFORMING PROCESSES, PRODUCTS AND SERVICES

Machine Learning, Deep Learning, and Generative AI will become increasingly integrated into all Processes, Products, and Services.

AI technologies like **Machine Learning (ML)**, **Deep Learning (DL)**, and **Generative AI** are transforming industries by lowering costs and expanding capabilities.

Key Benefits of AI Integration

- Automation of repetitive tasks boosting productivity through ML and robotic process automation.
- Rapid application development using Lo-Code/No-Code tools.
- Every process can be dramatically elevated while reducing time including marketing, sales, customer service, and HR to name a few.

Impact of Generative AI and Multimodal Language Models

- Augmented real-time decision-making with advanced language models.
- Collaborative robotics and voice interfaces for elevated productivity.
- Agentic AIs are intelligent software entities that autonomously complete tasks.

AI Applications Across Industries

- AI enabled demand forecasting, real-time audits, and AI-driven decisions to name a few.
- Rapid growth of Autonomous and semi-autonomous products, processes, and services.

AI is enhancing efficiency, enabling smarter decisions, and redefining human-technology interaction.

3 AUGMENTED THINKING AND MOVEMENT

Rapid advances in AI will accelerate Augmented Technologies, such as Augmented Thinking and Augmented Movement, to new levels of application.

What Is Augmented Thinking?

- **Humans using AI delivered real-time actionable insights and knowledge:** Augmented Thinking leverages AI to analyze large data sets, offering real-time insights that improve human decision-making and problem-solving.
- **Symbiotic relationship:** Humans and AI increasingly work together for optimal performance, with each amplifying the other's strengths.

How Do Augmented Movement Technologies Work?

- **Physical augmentation**: These technologies enhance physical functions, from sensory aids like hearing devices to powered exoskeletons.
- **Real-world examples**: In Japan, exoskeletons help healthcare workers lift heavy patients, while GM workers use them to reduce strain during vehicle assembly.

From cognitive boosts to physical enhancements, AI-driven augmented technologies are expanding human capabilities in unprecedented ways.

4. SEMI-AUTONOMOUS AND FULLY AUTONOMOUS TECHNOLOGIES

The rapid growth of Semi-autonomous and Fully Autonomous Technologies will disrupt and transform numerous industries.

What Defines Autonomous and Semi-autonomous Technology?

- **Autonomous technologies** rely on AI with networked sensors and actuators to fully automate tasks like driving cars, harvesting crops, piloting ships, or operating a growing list of machinery.
- **Semi-autonomous technologies:** Blend human control with autonomous capabilities that can intervene for safety, such as NextGen collision avoidance in vehicles.

Which Sectors Will See the Greatest Impact?

While autonomous applications extend far beyond transportation, **vehicle automation** will see the largest investment in the coming years, shaping industries from logistics to agriculture.

Autonomous and Semi-autonomous systems are paving the way for safer, more efficient operations across sectors, with vehicles leading this transformative shift.
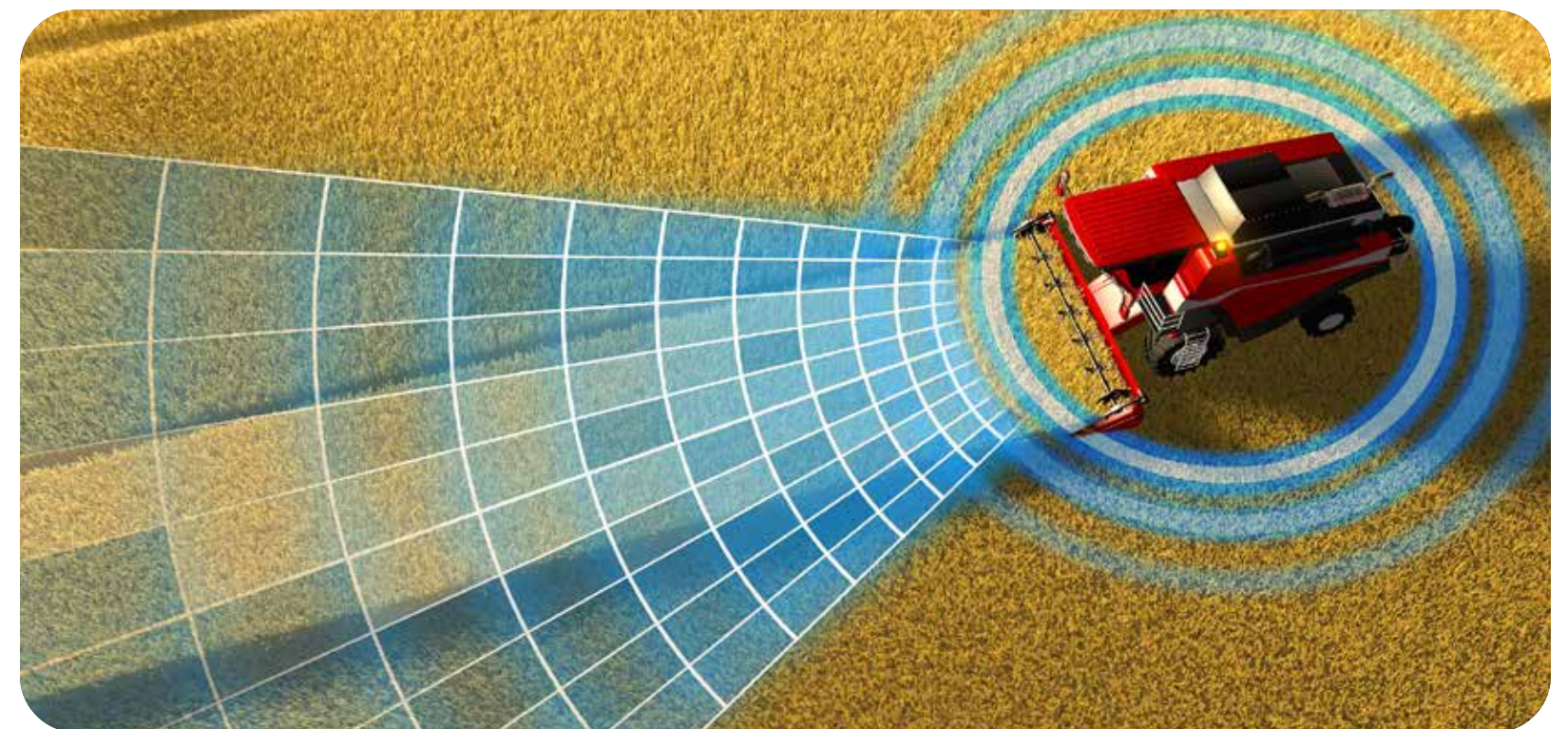
What Are Ultra-Intelligent Agents?

- **Voice and/or video-enabled intelligent Chatbots**: Generative AI powers advanced voice commerce, search, and interactive products, turning smart devices into mobile "concierges" on phones, wearables, TVs, and cars to name a few.
- **AI Enhanced business tools**: Traditional audio assistants (like those by Amazon and Apple) are evolving into a wide variety of **intelligent multimodal business bots** for retail, manufacturing, government, and healthcare applications to name a few.

How Will These AI Agents Transform Services?

- **Virtual Sales Assistants**: Retailers can deploy AI-driven assistants for real-time, hyper-personalized customer service.
- **e-Personal Health Assistants**: Smart devices including wearables can monitor health data, predict issues, and offer guidance.
- **AI-Enabled Help Desks**: The AI-enabled help desk will increasingly answer low and mid-level questions and solve problems quickly with human-like voice and/or video functions in any language streamline product and service support, as well as low level advisory roles across industries. Humans will be used when needed.
- **Products will increasingly be given a voice**: Ask a product on a store shelf or one you are using a question and get an answer.

Generative AI-powered agents will increasingly revolutionize how we interact with products and services, offering intuitive support, insights, and personalization at every touchpoint.

5 · ULTRA-INTELLIGENT ELECTRONIC AGENTS AND VOICE COMMERCE

Advances in Generative AI and Wireless Broadband are accelerating the use of Ultra-Intelligent Electronic Agents, enabling Voice Commerce, Voice Search, Intelligent Business Bots, and Voice-Enabled Interactive Products.

6 HIGH-SPEED STREAMING DATA ANALYTICS

The increasing Datafication of Everything driven by Generative AI, the Internet of Things (IoT), and Edge computing will drive the use of AI-enabled, High-Speed Streaming Data Analytics.

Why Is Big Data Growing So Rapidly?

- **Generative AI is creating more data**: The time it takes to create anything will be reduced exponentially giving humans more time to use AI to create more multimodal date. In addition, the use of synthetic data will increase.
- **Rapid expansion of IoT and edge computing**: The use of networked devices and sensors are growing exponentially generating unprecedented data volumes, as we add intelligence to "things" that produce more data.
- **Enterprise-wide insights**: Organizations aim to leverage data for fast, critical decisions, supported by AI-driven analytics.

What Role Does AI-Enabled Streaming Data Analytics Play?

- **Real-time actionable insights**: High-speed analytics enable rapid data processing, identifying actionable information at the speed of need from internal data as well as massive data pools.
- **Data quality management**: Real-time audits are increasingly separating relevant data from irrelevant or poor-quality data, improving decision-making accuracy.

With enterprise-level AI and advanced cloud services, data analytics is becoming essential for real-time insights, empowering smarter, faster business decisions.

7 AI DATA CENTERS AND DISTRIBUTED CLOUD PLATFORMS

The rapid increase in AI Data Centers, Distributed Cloud Computing Platforms and Services, along with Generative AI applications, will form the backbone of an accelerating level of digital transformation.

What Are the Key Benefits of Distributed AI Cloud Services?

- **Diverse AI Data Centers and new Cloud Models**: Businesses are embracing public, private, hybrid, and mobile AI enabled cloud models to suit various needs, from industry-specific applications to personal use.
- **Centralized cloud governance**: Distributing AI enabled cloud services across locations while maintaining centralized management provides flexibility with greater control.

How Are AI Data Centers and Advanced Cloud Platforms Reshaping Business Processes?

- **Cost-effective IT**: Cloud services streamline IT expenses by reducing the need for on-premises software, hardware, and capacity.
- **New product development**: Advanced AI driven cloud platforms enable companies to accelerate innovation creating new products, services, and industry-specific solutions.
- **AI Data Centers Growing Power Needs**: New AI Data Centers require massive amounts of energy driving the use of NextGen Nuclear Power Generators.

With AI Data Centers creating new specialized cloud capabilities, businesses can harness optimized AI solutions for IoT, edge computing, advanced security, and a host of others in this report, all accelerating digital transformation.

8   HARDWARE AND SOFTWARE VIRTUALIZATION

The use of Hardware and Software Virtualization, including Storage, Applications, and Networking, is rapidly increasing.

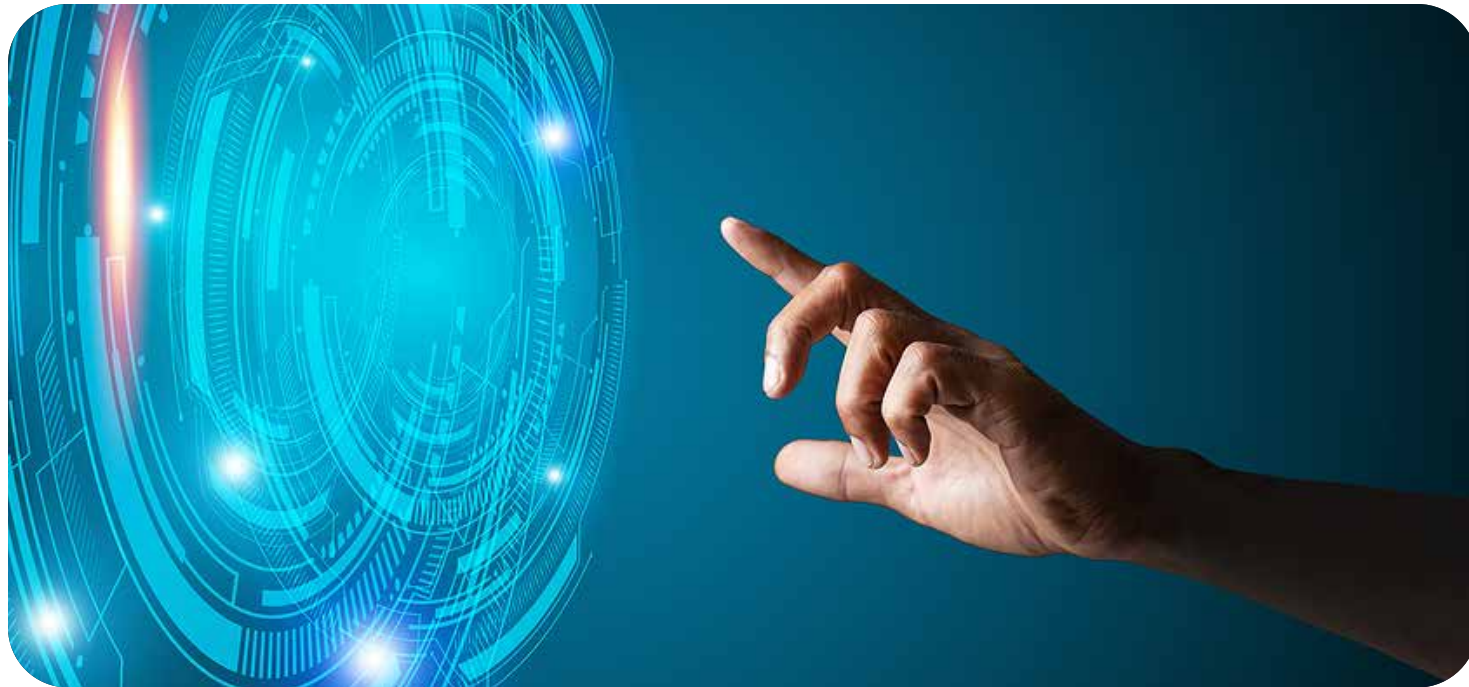### What Are the Key Components of Virtualization?

- **Software and hardware virtualization**: Includes virtualized storage, processing power, and AI-enabled services, allowing access to advanced capabilities quickly to any size organization.
- **IT as a Service**: Combining Hardware as a Service (HaaS) with Software as a Service (SaaS) provides businesses with flexible, scalable solutions. A few examples are AI as-a-Service, Cybersecurity as-a-Service, Blockchain as-a-Service and Quantum Computing as-a-Service.

How Does Virtualization Drive Cost Savings and Innovation?

- **Reduced IT costs**: Virtualization minimizes the need for extensive IT staff and costly infrastructure and upgrades. Adding capabilities takes much less time and money.
- **Access to supercomputer capabilities**: Mobile devices can tap into AIs advanced processing power for tasks like logistics and purchasing to name a few.

Virtualization enables businesses to leverage high-performance advanced technology with minimal expense, accelerating innovation and operational efficiency.

What Are the Key Applications of AR and VR?

- **Augmented Reality (AR):** AR overlays real-time information through smartphone cameras, or AR glasses. Increasingly, sleek AR glasses will allow users to view data overlaid on their real-world surroundings, with strong growth expected in business applications.
- **Virtual Reality (VR):** VR headsets create immersive, 3D environments, finding new commercial uses as hardware becomes more affordable. Industries from training to design benefit from VR's immersive potential.
- **Mixed Reality (MR)** merges real-world environments and computer-generated simulations. Users can interact with physical and virtual objects that coexist in mixed reality environments.

How Are Digital Twins Changing Development and Testing?

- **Advanced Simulations**: Digital Twins enable virtual testing of products, processes, services, and infrastructure—from drugs to buildings—before physical implementation, reducing risks and costs.

Advanced simulations and immersive environments are evolving rapidly with advances in AR, VR, MR and Digital Twins creating multiuser experiences, expanding applications for both business and entertainment.

9   AR, VR, MR AND DIGITAL TWINS

Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), and Digital Twins will move from rapid evolution to a revolutionary level of application.

What Role Does AI Play in Social Business Applications?

- **Enhanced engagement**: Social business applications are driving deeper collaboration, networking, and engagement among users. This, like any technology, can be used in both positive and negative ways.
- **Real-time sentiment analysis and influence**: Businesses will increasingly use behavior analytics to predict and prevent cybersecurity issues before they happen. Marketers use AI-driven behavior analytics to assess and influence individual and group sentiment and behavior. Personality profiling helps tailor messaging by identifying individual behavior triggers.

How Are These Technologies Impacting Trust?

- **Disinformation grows:** Disinformation is believed misinformation. Social platforms increasingly leverage Generative AI and behavior analytics to increase engagement. Paying advertisers can use that knowledge to influence users. Social media and Generative AI advances are giving rise to the use of Deep Fakes often leading to hyper personalized disinformation.
- **Erosion of trust:** The spread of AI-driven disinformation fuels an increasing global crisis of trust, shifting society from an Information Age to a "Disinformation Age."

Though these trends pose growing risks, they represent a "Soft Trend" that can be actively addressed to foster transparency and trust.

10

SOCIAL BUSINESS APPLICATIONS

Social Business Applications are accelerating with a focus on increasing Engagement and Influence using AI-powered Behavior Analytics and Personality Profiles.

11 EVERYTHING as-a-SERVICE (XaaS)

The growing use of the Virtualization for Processes and Services is enabling the expansion of "Everything as-a-Service" (XaaS).

What Is XaaS and How Is It Transforming Business Models?

- **Any process or service can be virtualized**: From HR and accounting to design and innovation, any process or service can increasingly be virtualized on a local or global level.
- **The distributed enterprise**: XaaS supports a distributed model, enabling organizations to rapidly innovate and expand internationally by virtualizing traditional services and products.
- **Broad range of processes and services**: Virtualized offerings now include HR as-a-Service, Sales as-a-Service, Marketing as-a-Service, Innovation as-a-Service, and more meeting diverse business needs.

How Is XaaS Extending Beyond Digital Services?

- **Subscription-based physical products**: Traditional products, such as vehicles, boats, and RVs, are increasingly adopting subscription models, transforming ownership experiences across industries.

XaaS is redefining business landscapes by making virtually any process or service available on demand, supporting continuous growth and digital transformation.

12 DATAFICATION OF EVERYTHING

The increasing speed and availability of wireless broadband from 5G/6G Wireless to Microsatellite Mega-Constellations will greatly expand global personal and business networking, drive the Datafication of Everything, and Democratize AI.

What Impact Will Global Broadband Access Have on Businesses?

- **5G advantages**: High-speed, low-latency 5G networks support the growth of multibillion-dollar industries, with both public and private networks offering flexibility. 5G can be deployed with either a public or private network providing large organizations with the option of a highly secure, private, wireless, high-speed network.
- **Communication satellites expanded reach**: Microsatellite mega-constellations such as *Starlink* are increasingly providing internet access worldwide, enabling businesses of all sizes to tap into global workforces and customer bases.

How Will Wireless Advancements Drive Innovation?

- **Integrated wireless value**: Combining multiple wireless systems enhances connectivity across ecosystems, fueling organizational innovation.
- **6G on the horizon**: With 6G in development, even faster speeds and capabilities are set to further advance connectivity.

Global wireless access and high-speed networks are transforming business landscapes by expanding reach and accelerating data-driven innovation.

13 — INTERNET OF EVERYTHING

The rapid convergence of the Internet of Things (IoT), Edge Computing, Advanced Cloud Platforms, Generative AI, and 5G/6G/Microsatellites is accelerating the formation of the Internet of Everything (IoE).

What Is Driving the Growth of IoE?

- **Machine-to-Machine (M2M) communications:** With billions of devices connected via inexpensive wireless and wired sensors and chips, M2M enables IoT devices to monitor and share data, and make decisions without human input, creating an intelligent, self-operating ecosystem.
- **Edge computing for instant insights**: Edge computing processes data locally, reducing the need to send all information back to centralized systems. This increases speed and decreases energy use while providing real-time insights and actions exactly when and where they're needed.

How Will IoE Impact Daily Life and Industry?

- **Industrial IoT (IIoT):** IIoT networks can predict and prevent failures, performing diagnostics and virtual repairs autonomously, optimizing operations in real-time.
- **Embedded AI:** AI at the chip level enhances Edge computing capabilities, enabling faster processing and more powerful applications in real-time.

The Internet of Everything is reshaping connectivity and intelligence, bringing seamless automation and rapid insights to homes, businesses, industries, and cities worldwide.

14 ADAPTIVE AND PREDICTIVE CYBERSECURITY

The exponential rise of Generative AI has elevated Cybersecurity challenges increasingly driving the growth in Adaptive and Predictive Cybersecurity Systems, along with a new level of employee cyber education.

What Are the Key Elements of Next-Gen Cybersecurity?

- **Adaptive and predictive systems**: AI-driven tools like behavioral analytics and network intelligence now enable anticipatory security that expands cybersecurity beyond reacting quickly after an attack, to a new layer of "Predict and Prevent" strategies.
- **Cyber education**: Businesses and institutions are prioritizing cybersecurity training, recognizing it as a frontline defense to enhance awareness and reduce human-error vulnerabilities.

How Do Quantum Computing and Generative AI Impact Cybersecurity?

- **New challenges and solutions**: Quantum computing, already available through platforms like Amazon, increasingly presents both a breakthrough in encryption capabilities and a heightened threat to existing encryption systems.
- **Generative AI's dual role**: While Generative AI can enhance security measures, it also increases risks by aiding attackers in devising sophisticated breach tactics.

The future of cybersecurity lies in adaptive, anticipatory systems that can predict and thwart threats, supported by advanced technologies and a well-informed workforce.

15 IDENTIFICATION AND VERIFICATION TECHNOLOGIES

Organizations and users will increasingly adopt identification and verification technologies like Multi-Biometrics, Digital Keys, and Advanced Tokenization.

What Are the Latest Advances in Biometrics?

- **Multiple biometrics**: Expanding beyond first-gen options like fingerprints and facial recognition, new biometrics will include heartbeat and blood vessel patterns, adding layers of security through wearables.
- **Device integration**: Biometrics and tokenization are being embedded into smartphones, tablets, wearables, and other security devices, enhancing access control across platforms.

How Will AI and Quantum Computing Impact Identity Management?

- **Adaptive security levels**: Different combinations of biometrics, tokenization, digital keys, and AI-driven verification can match security levels to specific needs, from routine logins to high-security access.
- **Future-proofing with AI and Quantum**: AI-driven verification paired with quantum encryption will increasingly provide powerful safeguards, fortifying identity management against evolving threats.

With adaptive, multi-layered verification, individuals and organizations can implement robust, tailored security protocols, protecting users in an increasingly digital landscape.

16 WEB 3 DECENTRALIZATION

The use of Industrial Blockchains will accelerate across various industries, while Cryptocurrency, Digital Currency, and NFTs continue to grow, all fueling the trend toward Web 3 internet decentralization.

What Are the Key Applications of Blockchain Beyond Cryptocurrency?

- **Direct, secure transfers**: Blockchains eliminate intermediaries, allowing secure, transparent exchanges in areas like contracts, real estate, insurance, and voting.
- **Distributed trust**: By increasing transparency, blockchain technology is being adopted in high-cost, low-transparency sectors like healthcare, reducing inefficiencies and improving trust.

What is Decentralized Finance (DeFi)?

- **DeFi Continues to Disrupt Financial Services**: Generative AI and Blockchain-enabled innovations will accelerate Decentralized Finance increasingly disrupting traditional banking, insurance, financial advising, accounting, and other industries.

How Are Cryptocurrencies, Digital Currencies, and NFTs Evolving?

- **Growth of Crypto and Digital currencies**: Many countries are piloting digital currencies for streamlined, centralized transactions, while cryptocurrencies like Bitcoin grow as investments despite volatility.
- **NFT applications**: Beyond art, NFTs are expanding to fields such as certifications, trademarks, and copyrights, leveraging blockchain to ensure authenticity and ownership.

As blockchain applications diversify, they're reshaping industries and advancing a decentralized, transparent, and secure Web 3 ecosystem.

17 INTELLIGENT MOBILE DIGITAL PLATFORMS

Smarter Smartphones and Tablets, powered by AI and connected via 5G/6G and Microsatellites, will increasingly serve as Intelligent Digital Platforms for mobile communication, collaboration and innovation.

What New Capabilities Are Mobile Devices Gaining?

- **Integrated Generative AI and 5G/6G**: As AI is embedded into device chips and Small Language Models plus 5G becomes widespread, mobile devices will support faster, more powerful applications, becoming our intelligent mobile concierge.
- **On-demand services**: Smartphones now offer instant access to virtual services, making them essential for multimedia, communication, collaboration and all business tasks.

How Will Businesses Leverage Advanced Mobile Hardware?

- **Enterprise mobility strategy**: By adopting virtualization and XaaS, companies can enhance marketing, collaboration, education, and more, using mobile platforms to drive growth and innovation globally.

With Generative AI and 5G/6G/Microsatellites, mobile devices are reshaping global computing, empowering businesses to innovate and scale through advanced mobile strategies.

18 AI-ENABLED ADVANCED MOBILE APPLICATIONS

Advanced Mobile Apps, Web Apps, and Super Apps—powered by Generative AI will accelerate innovation in mobile applications.

How Are Mobile Apps Transforming Business Functions?

- **Broadening applications**: Mobile apps increasingly play critical roles in purchasing, logistics, marketing, sales, and maintenance, supporting seamless, on-the-go business operations.
- **AR and VR integration**: Enhanced multimedia applications accelerated by Generative AI give companies a competitive edge, providing users with hyper-personalized, interactive information anytime, anywhere.

What Role Do Super Apps Play in Mobile Ecosystems?

- **Expanding capabilities**: Super Apps combine various app functions on a single platform, with ecosystems that enable third-party integrations, offering an all-in-one experience. Add to this the integration of Generative AI and a revolution is created.
- **Empowering billion-dollar industries**: The high speed and low latency of 5G and soon 6G increasingly unlock potential for billion-dollar businesses driven by new smart mobile capabilities.

Mobile innovation through advanced apps, 5G/6G, and Generative AI is transforming how businesses operate, creating immersive, high-value experiences across industries.

19 SMARTER MULTI-SENSORY WEARABLES

The growing use of Smart Wearables, equipped with Advanced Sensors, will increasingly offer personalized monitoring and diagnosis of physical and mental health issues, along with enhanced communication and collaboration capabilities.

What Health Benefits Do Smart Wearables Offer?

- **Personalized health insights**: With sensors that track physical and mental health, wearables provide real-time data for early diagnostics and ongoing monitoring.
- **Smart patches**: New wearables like skin-attached patches, offer remote health management, providing continuous diagnostics and health updates via wireless transfer.

How Are Wearables Expanding in Personal and Business Applications?

- **Business potential**: Smart wearables increasingly aid in workplace communication and collaboration, while companies like Apple, Google, and Samsung compete to lead this growing market.
- **Innovation through advanced sensors**: As sensor technology advances, wearables will continue to introduce new features and applications, driving demand across sectors.

With continuous health monitoring and improved connectivity, smart wearables are poised to transform healthcare and business communication.

AI-ENABLED ROBOTICS AND ADVANCED AUTOMATION

20

Advanced AI-Enabled Robotics and Cobots take Robotic Automation to a new level.

What Are Advanced Robots?

- **Advanced Robots**: Advanced robots can be any size and shape, and they can be controlled in either a semiautonomous or autonomous way. They are already being used in every industry, and that includes personal robots. With AI, advanced sensors, and communication capabilities added to advanced movements, the use of robotics will grow exponentially.

- **Advanced Humanoid Robotics**: Advanced hominoid robotics, as showcased by companies including Boston Scientific, are increasingly human-like in their movements and functions. They have increasingly sophisticated sensors that can talk, see, and hear, and much more. Business, as well as military applications, are growing rapidly.

- **Advanced Cobots**: Cobots are robots of any shape or size that can work seamlessly with humans.

- **Large Behavior Models (LBMs)**: LBMs will increasingly be used to copy the physical processes humans use to accomplish work and apply those movements to robots.

- **Advanced Robotic Automation**: With advances in networked sensors, vision systems and other technologies in this report, flexible robotic automation systems with advanced capabilities will increase exponentially.

Advanced robotics and robotic automation will increasingly be used in every industry growing digital transformation in a multidimensional way.

21 GENERATIVE AI TRANSFORMS DIGITAL LEARNING

AI-Integrated Tele-Education, Remote Instruction, Online Learning, and Gamified Training will Transform Digital Learning.

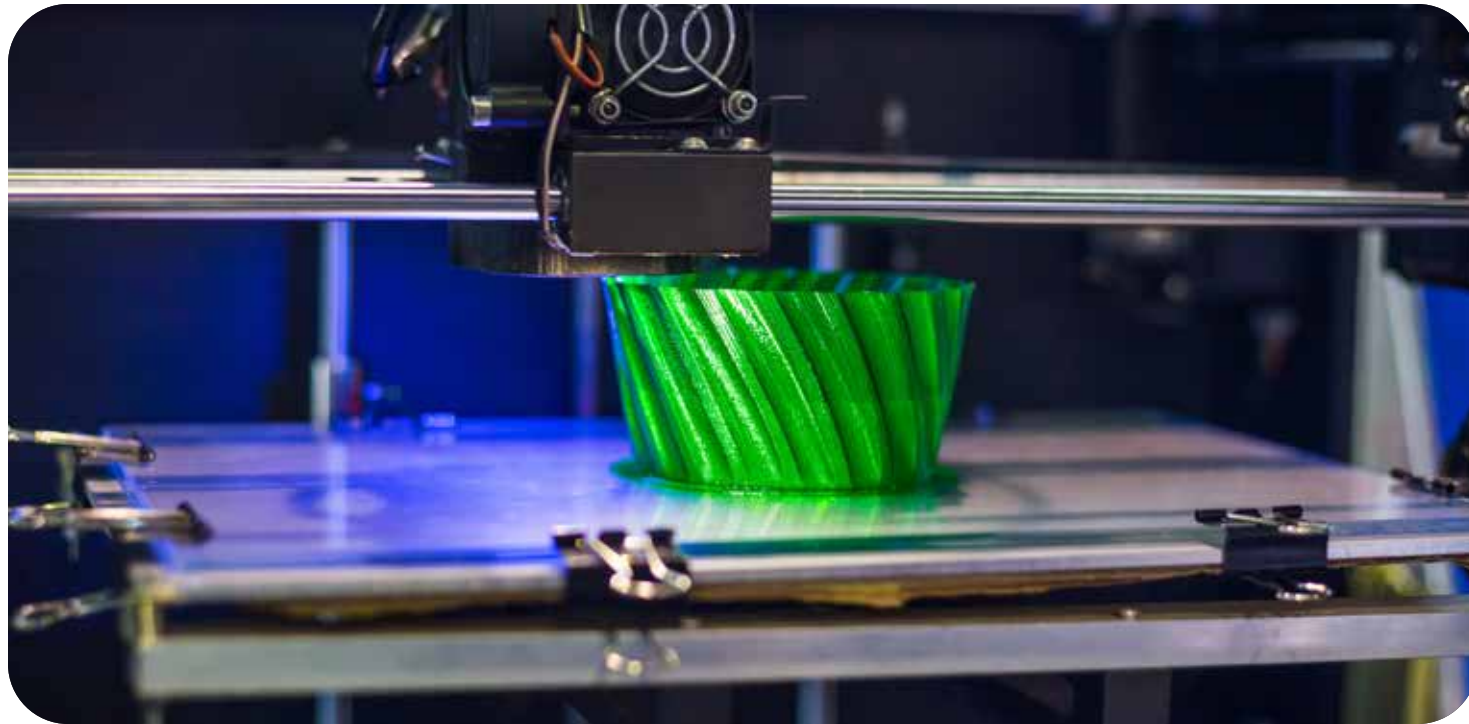### What Role Will Generative AI Play in Education?

- **Enhanced critical thinking and learning support**: Generative AI, like ChatGPT, with educators' guidance, is helping students develop critical thinking and enhanced creativity through guided interactive tools and AI-enabled tutors. For students, their grade is less about the answer, and more about how they arrived at the answer.
- **Immersive blended learning**: AI chatbots, AR, and VR create a mix of online and in-person learning, offering students a richer, interactive experience.

How Will Gamification and Self-Diagnostic Systems Impact Training?

- **Engaging learning models**: Gamified systems make learning fun and competitive, encouraging deeper engagement with personalized, skill-based training that demands critical thinking.
- **Accessible and skill-focused courses**: MOOCs and competency certifications from recognized institutions are reducing geographic and financial barriers, helping individuals keep pace with rapidly changing skills.

With Generative AI, immersive tech, and gamification, education is evolving to meet the demand for flexible, skill-based, and accessible learning experiences.

What Are the Key Applications of 3D Printing?

- **Final product manufacturing**: Initially used for prototypes, 3D printing increasingly produces final items like jewelry, medical prosthetics, car parts, and even buildings, allowing for customization and rapid production.
- **Healthcare innovations**: 3D printers are producing critical medical items like prosthetic limbs, jawbones, blood vessels, and organs, advancing personalized healthcare solutions.

How Will 3D Printing as a Service Impact Businesses?

- **On-demand production and shipping**: Companies like Amazon and FedEx are poised to offer 3D Printing as a Service, enabling rapid, local manufacturing and shipping of custom designs globally.

With its ability to create complex items on-demand, 3D printing is driving a manufacturing revolution, minimizing costs and supply chain dependencies.

22 **ADVANCED 3D PRINTING**

Advances in 3D Printing (Additive Manufacturing) are shifting from rapid evolution to revolution, with applications expanding across an increasing number of industries.

23 AUTONOMOUS AND SEMIAUTONOMOUS DRONES

Drones are reaching new levels of capability with AI-enabled Autonomous and Semi-Autonomous integration accelerating advanced applications across industries.

What Are the Expanding Applications of Drones?

- **Diverse industries**: From search-and-rescue and medical delivery to agriculture monitoring, utility inspections, and real estate, drones are transforming operational efficiency.
- **Military innovations**: Military drones, including unmanned planes, ships, and tanks, continue to grow in size and capability, advancing defense and reconnaissance operations.

How Are AI and 5G and Microsatellite Enhancing Drone Functionality?

- **Real-time data and automation**: AI-driven drones with 5G/6G/Microsatellite connectivity enable real-time decision-making, enhancing tasks like precision agriculture, remote monitoring, and far more.
- **Microsatellite support**: Microsatellite networks will expand drones' communication range, allowing them to operate in remote areas with high reliability.

With AI, advanced networking, and versatile sizes, drones are set to increasingly revolutionize industries, providing efficient solutions for complex challenges.

SUSTAINABILITY ELEVATED BY AI ACCELERATED RENEWABLE ENERGY

24

The focus on Sustainability will continue to grow rapidly, elevated by advancements in Energy Storage, Microgrids, Renewable Energy Technologies, Sustainable Fuels, Green Energy (including Green Hydrogen), and Electric Vehicles.

What Role Does Energy Storage Play in Renewable Energy Expansion?

- **Stabilizing green energy**: Advanced energy storage enables the efficient use of wind, solar, and other renewable sources by storing excess energy for later use.
- **Smart battery systems**: Companies like Tesla offer battery solutions that allow homes and businesses to store energy, supporting personal and national microgrids for a more resilient energy infrastructure.

How Are Electric Vehicles and Green Hydrogen Contributing?

- **EVs as energy sources:** Electric vehicles will increasingly plug into and power homes when needed, enhancing grid stability and reducing reliance on traditional power sources.
- **Repurposing EV batteries**: Retired EV batteries can be repurposed for affordable energy storage, extending their life cycle and lowering storage costs.
- **Green hydrogen**: Produced from renewable sources, green hydrogen offers a sustainable alternative to natural gas-derived hydrogen, fueling a variety of clean energy applications. Green hydrogen allows for the transportation of green energy at scale.

Through sustainable fuels, green hydrogen, and energy storage, advancements in renewable technology are paving the way for a cleaner, more resilient energy landscape.

GENOMICS, SYNTHETIC BIOLOGY AND BIOMANUFACTURING

25

Genomics, Gene Editing with CRISPR, mRNA technology, Synthetic Biology and Biomanufacturing will experience rapid growth.

What Are the Key Applications of Synthetic Biology and Gene Editing?

- **Synthetic biology**: By integrating biotechnology, genetic engineering, and molecular science, synthetic biology enables the design of engineered biological systems for applications like material production, energy generation, and even food development.
- **CRISPR and gene editing**: CRISPR allows precise editing of DNA, facilitating the creation of disease models, genetically modified organisms, and the correction of genetic mutations, opening new avenues for personalized medicine.

How Will mRNA and Genomic Technologies Shape Healthcare?

- **mRNA advancements**: Building on its success with COVID-19 vaccines, mRNA technology is poised to tackle a wider range of diseases, offering adaptable solutions for future pandemics and therapeutic development.
- **AI-driven genomics**: AI accelerates gene editing and synthetic biology, making it possible to rapidly analyze genomes, edit genes, and engineer biological systems with high precision.

The convergence of AI, genomics, and synthetic biology is driving a new era in biotechnology, unlocking solutions for complex challenges in medicine, materials, and sustainability.

Turn Disruption Into Opportunity and Advantage

1

Identify the Hard Trends and Related Opportunities

- Identify the Hard Trends that will impact your business and/or customers over the next five years.

- What are the related opportunities?

2

Focus on Transforming Processes

- How will you transform your products, services, or processes over the next five years?

- How will you transform your career over the next five years?

- Based on the Hard Trends, what skills will you need to learn to stay reievant?

3

Redefine and Reinvent Products and Services

- What products or services are ripe for reinvention?

- What would take the least amount of time and/or money to redefine or reinvent?

14

Refine

- Refine your list of top strategic actions to only a few "must do" actions.

What criteria does Daniel Burrus use to determine the Top 25 Technology-Driven Hard Trends for his annual report?

Burrus Research Inc. has been researching all areas of technology from AI and Genomics to Lasers and Nanotechnologies for over three decades. In this report, Daniel Burrus identifies the Top 25 Technology-Driven Hard Trends using a strategic and anticipatory framework. His goal is to help organizations understand and profit from the forces driving technological change by turning disruption into opportunity. His criteria ensures that the selected trends are transformative, actionable, and grounded in his concept of Hard Trends.

1. Exponential Growth and Technological Maturity

For a trend to make the list, it must be **advanced enough to drive exponential growth**. Burrus emphasizes that these trends aren't speculative; they must be rapidly evolving and ready to deliver significant advancements. Each trend must have a clear path to impacting business strategies and society within the coming year and beyond.

2. Cross-Industry Relevance and Impact

Burrus prioritizes trends that can **transform multiple sectors simultaneously**. Technologies like **Artificial Intelligence** and **Blockchain** impact healthcare, finance, retail, and more. Their broad reach reshapes industries, creating new opportunities for innovation and growth.

3. Certainty Based on Hard Trends

The selected trends must be **anchored in Hard Trends**, *future certainties* driven by measurable forces like technological advancements, demographic shifts, and regulatory changes. This distinction is crucial: Hard Trends offer the certainty needed for bold, low-risk actions, unlike Soft Trends that may or may not occur.

4. Burrus's Anticipatory Philosophy

As founder of Burrus Research, Burrus uses this methodology to help clients **shift from a reactive to an anticipatory mindset**. His approach demystifies technological change, offering clarity and strategic foresight. By leveraging these trends, organizations can gain a **competitive edge**, innovate proactively, and position themselves as industry leaders.

Turn Digital Disruption Into a Powerful Competitive Advantage

Daniel Burrus, renowned Technology Futurist and Disruptive Innovation Expert, has built a global reputation for accurately predicting tech shifts and their impact on business. He has guided hundreds of clients to seize emerging opportunities and develop winning strategies using cutting-edge trends.

Daniel's presentations deliver practical insights you can apply immediately. Take it further with **custom workshops**, **interactive learning systems**, and **exclusive resources** to future-proof your organization and gain a lasting edge.

Burrus Books and Publications

Unlock the strategies to drive exponential growth and **seize tomorrow's opportunities today**—before your competitors do!

Visit Store

Get Ahead of the AI Revolution

Discover how to **leverage AI-driven trends** to **future-proof your business** and **outpace the competition** with actionable insights and proven strategies. Don't just react to AI— harness it to transform your future."

Download The Report

Anticipatory Leader Membership

This is your opportunity to learn, grow and interact with Daniel Burrus each month in a fast-paced online experience designed to help you and your team quickly master the art of anticipatory thinking.

Become a Member

Daniel Burrus is a master at tailoring his presentations to the specific needs of your audience.

Daniel Burrus masterfully customizes his workshops and private consulting sessions to align seamlessly with the strategic goals and challenges of your organization.

Take Your Audience to the Next Level with Technology Futurist Daniel Burrus

Engage your audience with tailored presentations that illuminate future trends and provide actionable strategies for success.

Keynote Presentations

Elevate Your Business with an AI Strategy Session

Uncover tailored AI opportunities to boost efficiency, enhance innovation, and drive impactful results.

Strategy Session

An Innovative and Dynamic Alternative to an In-Person Keynote Presentation

Engage your audience with personalized, interactive presentations designed to address your organization's challenges and unlock opportunities for growth.

Digital Keynotes

Disruptive Innovation Planning

Stay ahead of disruption and transform your approach to innovation and elevate your organization from success to significance.

Innovation Planning

Daniel Burrus is considered one of the World's Leading Technology Futurists on Global Trends and Disruptive Innovation.

The New York Times has referred to him as one of the top three business gurus in the highest demand as a speaker.

Shaping the Future of Industry and Business

Based on his decades of accurate forecasting, Daniel Burrus offers invaluable insights into the future of AI-driven industries:

- **Predictive Analysis**: Using his Hard Trend methodology, Burrus can forecast how AI will reshape specific industries, enabling proactive strategy development.
- **Ethical Considerations**: He provides guidance on navigating the ethical implications of AI adoption, ensuring responsible innovation.
- **Workforce Transformation**: Burrus offers strategies for preparing workforces for AI integration, focusing on upskilling and reskilling initiatives.

By leveraging Daniel Burrus's expertise, organizations can position themselves at the forefront of AI-driven innovation, ensuring they not only adapt to the future but actively shape it. His unique blend of technological foresight, strategic thinking, and practical application makes him an indispensable resource for any organization looking to thrive in the AI era.

Connect with Daniel

Unlock the power of anticipation with renowned technology futurist and business strategist Daniel Burrus. Discover how to see disruption before it strikes, transform obstacles into opportunities, and establish a future-proof strategy to leap ahead of the competition.

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Connect with Daniel Burrus to understand and know what's next: