

Impact & Opportunities from future Technology Transitions

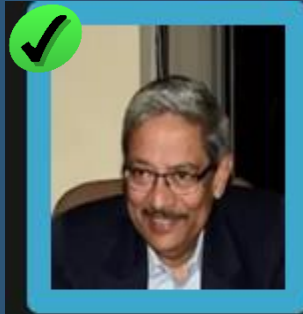
PERFORMATICA

STRATEGY · OPERATIONS · TECHNOLOGY · ALLIANCES



March 24th, 2022

10:30 AM CST (USA) / 9 PM IST (INDIA)



Dr Tilak Agerwala
Panelist

IBM Vice President (Retired),
Adjunct Associate Professor, Pace
University-New York



Sabyasachee Panda
Panelist

CTO, Performatica and Co-Founder,
Greenojo Consulting



Murthy Divakaruni
Panelist

Founder & CEO, Performatica



Dr Darukhanavala
Moderator

Industry Advisor, Energy & Power,
Technology Innovation, Ex-CTO, BP



Section	Topic	Speaker/s
Introduction	Insights on Future Technologies	Dr Tilak Agerwala
Keynote	Key Future Technology Transitions	Sabyasachee Panda
Closing Remarks	Benefits to Business & Society	Murthy Divakaruni
Panel Discussion (Moderator)	Discussion and Q&As	Speakers and Dr Darukhanavala
Key Takeaways	Future Outcomes	Murthy Divakaruni

- *The way we work, play, learn, communicate, relate, and interact will be transformed:* **Virtual, distributed, collaborative, augmented and assisted.**
- *Computing is the core enabler, evolving from “calculating” to “statistical learning” or machine learning:* **Raises many ethical concerns.**
- *Life-cycle of ideation, design, development, deployment and use must become more humanistic and multidisciplinary:* **Trust is essential for effective transitions.**

Future Technology Transitions



Industry 4.0 to 5.0

- Mass Customization
- Decentralized



Web 2.0 to Web 3.0

- Decentralized Apps
- Private & Secure



Classical to Quantum

- Simulations
- Deep Learning
- Cybersecurity



Robots to Cobots

- Collaborative Robots
- Man + Machines in the workplace



Internet to Metaverse

- Digital Immersive Twins
- Gamification



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Impact Areas

Leadership
Development

Business
Performance

Digital Execution

Technology Transitions

Industry 4.0 -
Industry 5.0

Web 2.0 - Web 3.0

Classical - Quantum

Robots - Cobots

Internet - Metaverse

Common Services

Process
Automation

AI/ML
Modelling

Augmented
Operations

Decentralized
Assets

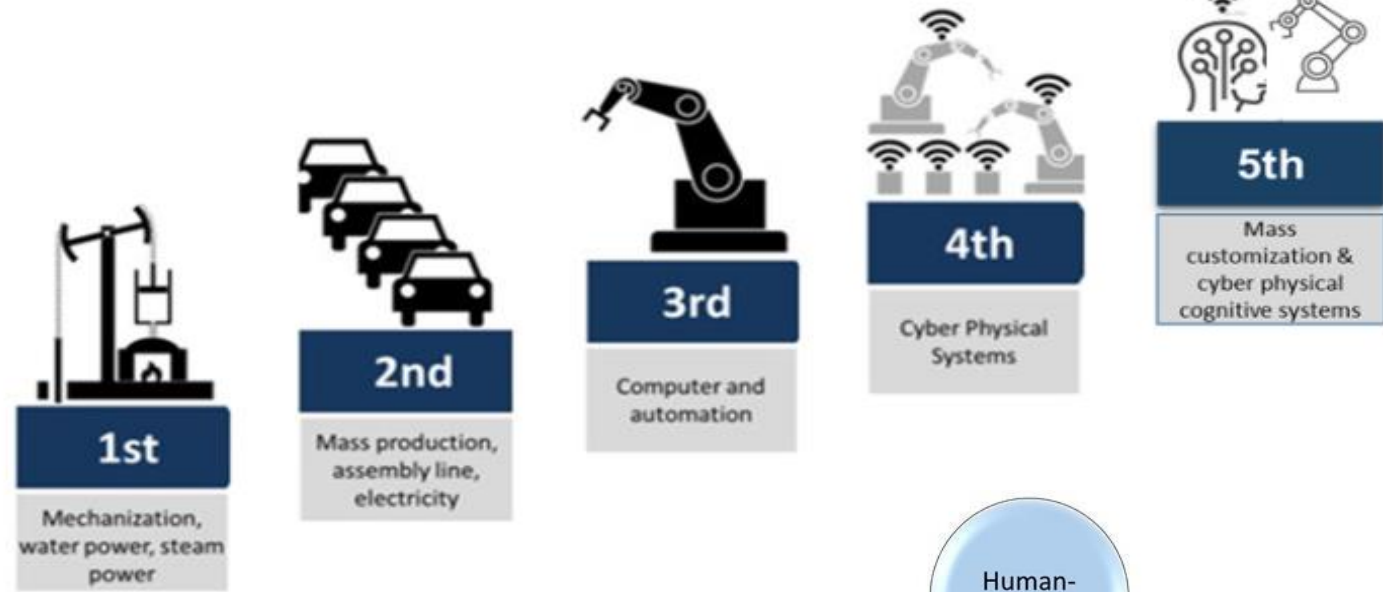
Internet of
Things

Ethical
Design

Cyber-
Security

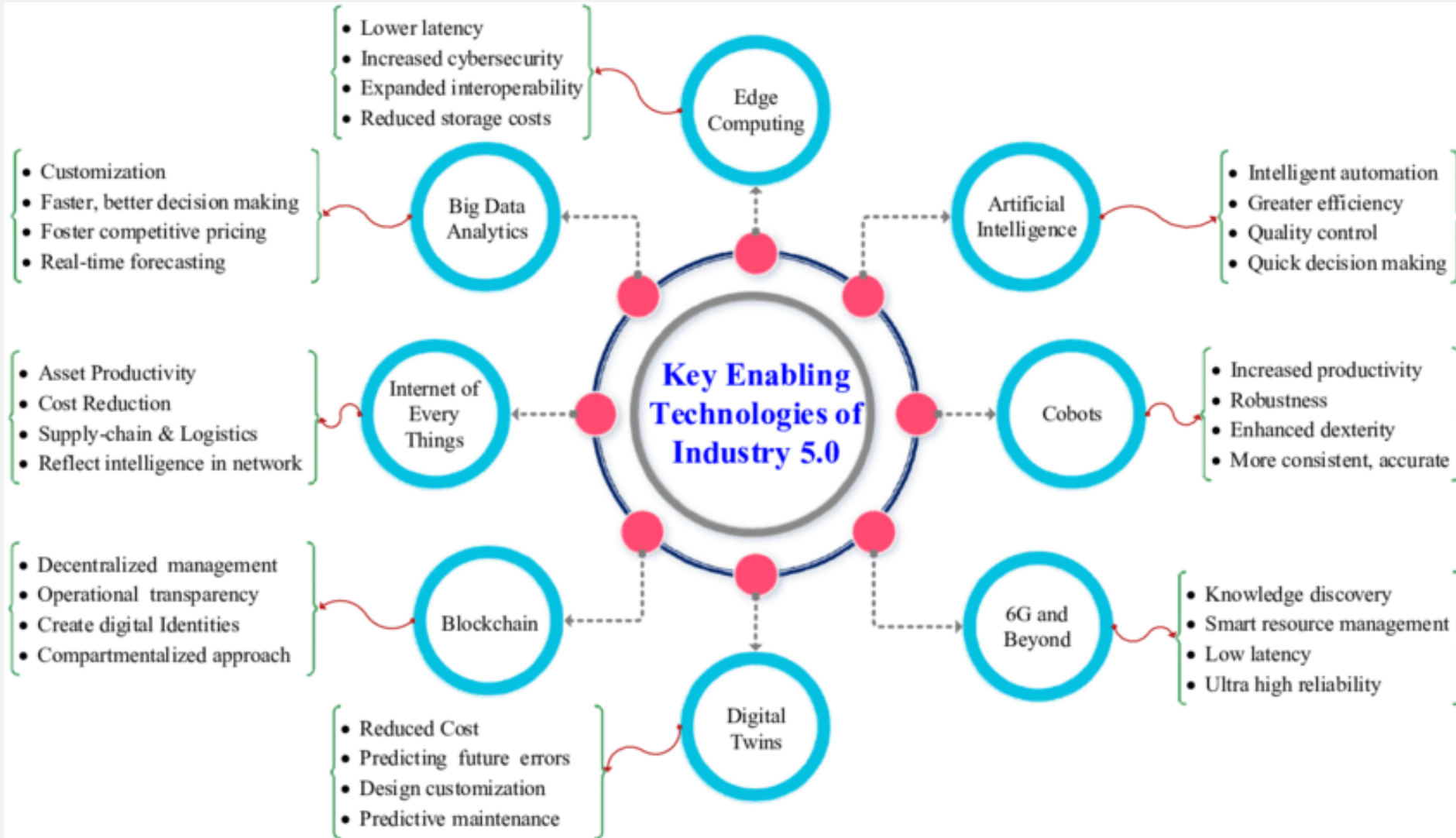
Industry 5.0 Readiness

Mass customization of the customer experience through digital transformation



"You can expect every experience to be individually customized to YOU and your needs"

Industry 5.0 - Key Technology Shifts



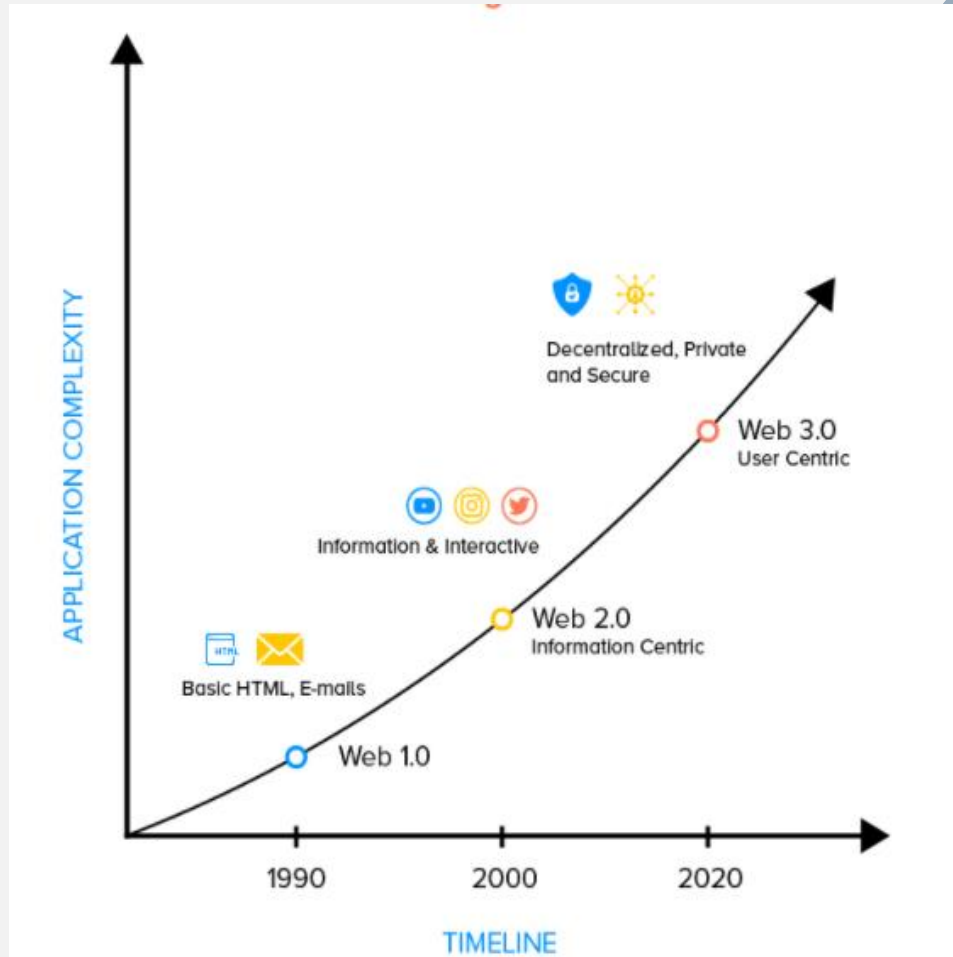
Examples

<https://forge-digital-twin.autodesk.io/>

<https://demo.digitaltwinexchange.ibm.com/>

"Key Technology will target the consumer's point of view"

Web 3.0 Transition - User Centric, Decentralized Apps



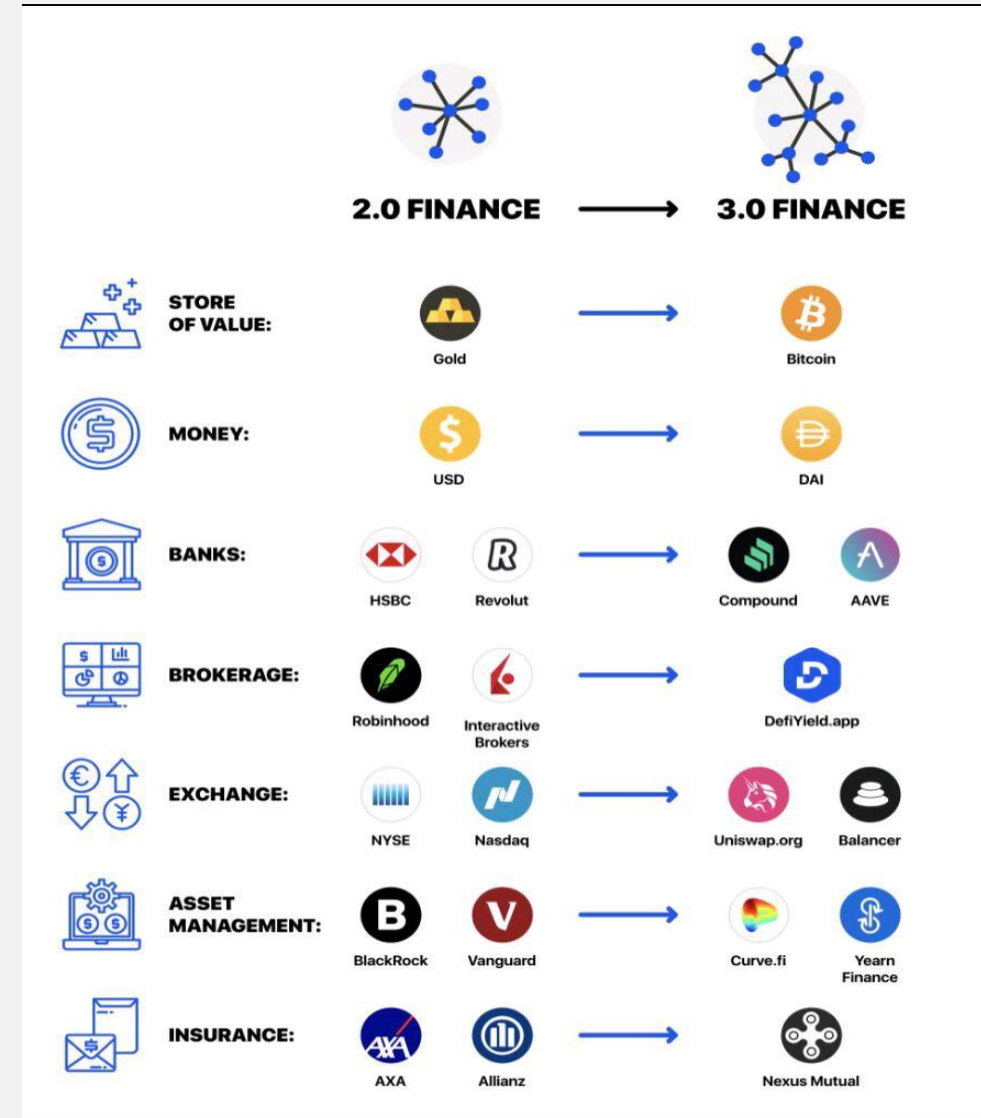
	WEB2	vs.	WEB3
PRIVACY Do you control the data?	NO Data is controlled by provider on their own servers – user agrees to terms and conditions to use service.		YES Data is controlled by user who sets terms and conditions for the use of their data (laying the groundwork to be compensated for it)
ACCESS Do you hold the keys to the account?	NO The service holds the keys to the account, assists the user with password recovery, and can cut user from service.		YES User accountable for securing and protecting the keys to the account, and fully controls access.
CHOICE Can you easily switch providers?	NO Mega-platforms are designed as walled gardens that lock users into their service. Leaving is possible, but it means abandoning the investment made in, for example, building your social network on Facebook.		YES Based on protocols so users can take their assets and investments with them, such as a social network following or digital goods. This is similar to how email works today—because it's based on a standard protocol, it is possible to switch providers without losing contacts.

"The future user will be fully in control and therefore accountable"

Web 3.0 Impact - Apps & Finance



Ready Ecosystem for onboarding users

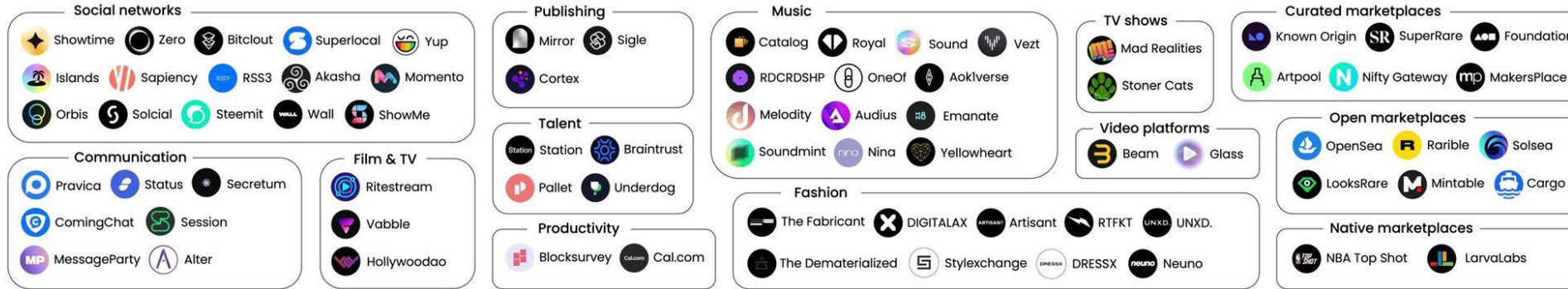


"The transition to Web 3.0 is already happening in some sectors"

Web 3.0 - Ecosystem

The Web3 Landscape

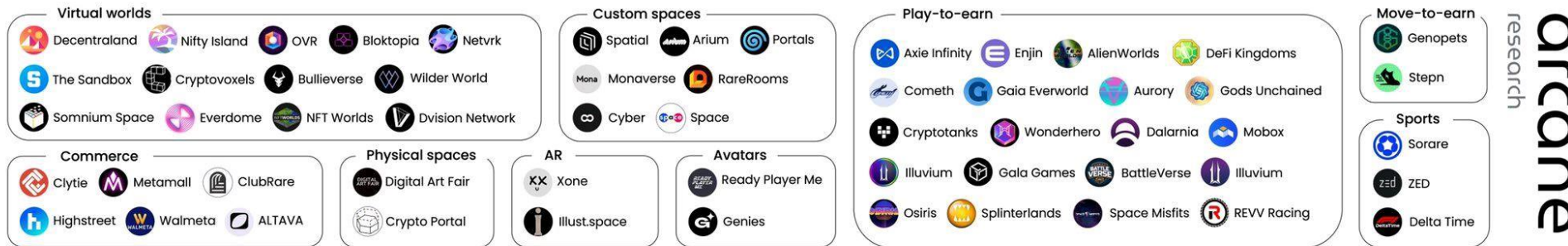
Discovery



Infrastructure



Experience



The overview is not all-inclusive



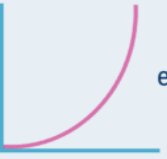

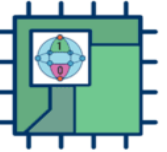



Web3.0 maturity as evident by this growing landscape

ORCONE
research

”There are lots of players – consumer will decide who will stay ”

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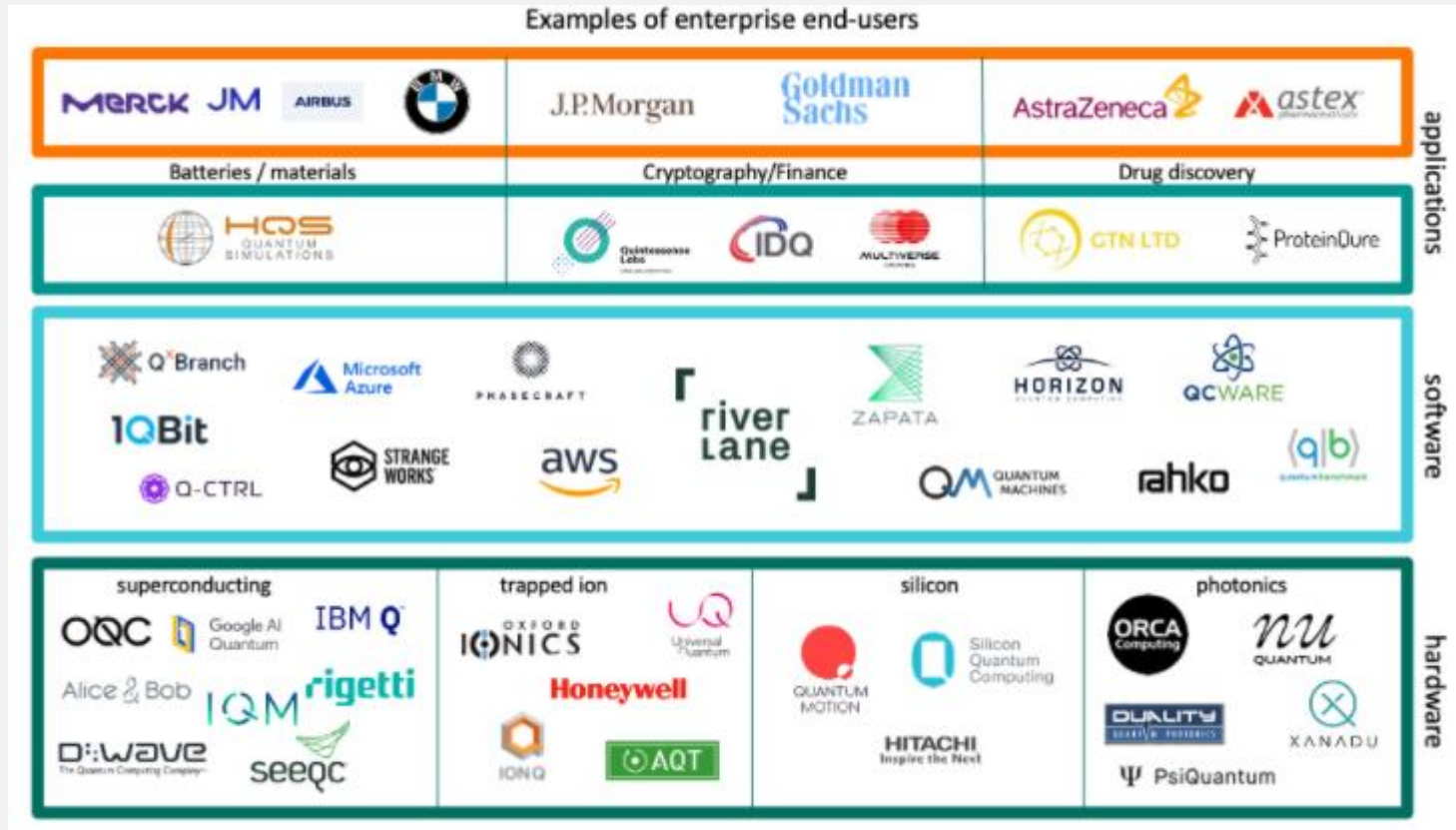
Quantum Computing - Quantum Analytics

Quantum Computing	Vs.	Classical Computing
 <p>Calculates with qubits, which can represent 0 and 1 at the same time</p>		 <p>Calculates with transistors, which can represent either 0 or 1</p>
 <p>Power increases exponentially in proportion to the number of qubits</p>		 <p>Power increases in a 1:1 relationship with the number of transistors</p>
 <p>Quantum computers have high error rates and need to be kept ultracold</p>		 <p>Classical computers have low error rates and can operate at room temp</p>
 <p>Well suited for tasks like optimization problems, data analysis, and simulations</p>		 <p>Most everyday processing is best handled by classical computers</p>



"Quantum Computing is finally coming of age"

Quantum Computing - Ecosystem



“Quantum Computing will touch our everyday lives”

Quantum Computing - Use Cases



Health care and life sciences

Researchers could improve the speed and accuracy of disease diagnosis and treatment, discover new drugs, and develop customized medicines and interventions.

- Drug and pharmaceutical discovery
- Precision medicine
- Disease identification and detection
- Protein folding



Materials science and discovery

Engineers may be able to discover new materials and enhance existing materials to be more durable, efficient, and effective.

- Solar cells
- Clean carbon capture
- High-entropy alloys
- Lossless energy transmissions
- High-speed rail



Chemical process simulation and optimization

Scientists could develop and test new industrial processes that could conserve natural resources, reduce emissions, lower cost, and speed production.

- Ammonia/fertilizer production
- Clean hydrogen production
- Petroleum reservoir production

Reference - Deloitte

”Mature Use cases are yielding results ”

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Cobots - Collaborative Workforce

Collaborative Robots

Traditional Industrial Robots

VS



Collaborative robots (cobots) — robots that work alongside people — and traditional industrial robots differ in many ways. Here are the key differences that make cobots the game-changer in robotics.

ECOMMERCE
PIECE-PICKING



the piece-picking solution for goods-to-order picking

RIGHAND
ROBOTICS

MANUFACTURING
PICK-AND-PLACE



READY
SUPPLY

COMMERCIAL-SCALE
3D PRINTING

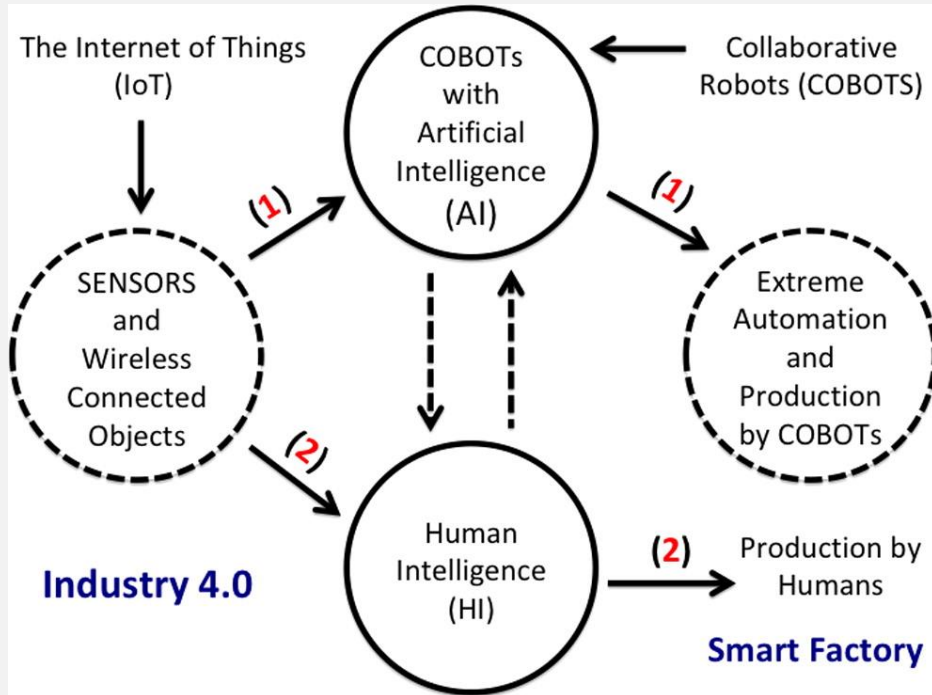


VOODOO
MANUFACTURING

CBINSIGHTS

”Robots will transform to trainable coworkers as Cobots”

Cobots - Smart Factories



Reference - Research on Industry 5.0

Discover Our Cobots List with More than 130 Collaborative Robots

The screenshot shows a search interface for collaborative robots. It includes a search bar at the top, followed by four filter sliders: 'DoF' (0 to 7), 'Payload (Kg)' (0.5 to 30), 'Reach (mm)' (100 to 2300), and 'Repeatability (mm)' (0.01 to 0.1). Below the sliders are dropdown menus for 'Country' (set to 'All') and 'Market Availability' (set to 'All'), along with 'Submit' and 'Reset' buttons. The interface displays a grid of eight robot models with their names: ABB IRB 1400 YUMI, ABB IRB 14050 YUMI, ABB ROBERTA, ACUTRONIC ROBOTICS MARA, and four smaller orange robots.

Reference - Sample Cobots Marketplace

Example - <https://www.youtube.com/watch?v=ZII-1am0pF4>

“Cobots are available today in market-places”

Cobots - Application of Cobots

The rise of cobots

Operations

Cobots can simplify various tasks in operations management such as hand guiding, machine tending, pick and place, packaging, and inspection.

Healthcare

Cobots can monitor health conditions of patients and assist doctors and medical staff in several tasks.

Agriculture

Agricultural cobots can help farmers in harvesting, planting seeds, and transporting raw materials.

Security

Cobots can be deployed as autonomous vehicles for patrolling.

Food services

Restaurant owners can deploy cobots for simple cooking tasks such as flipping burgers.

Reference - Allerin.com



Reference - sp-automation.co.uk


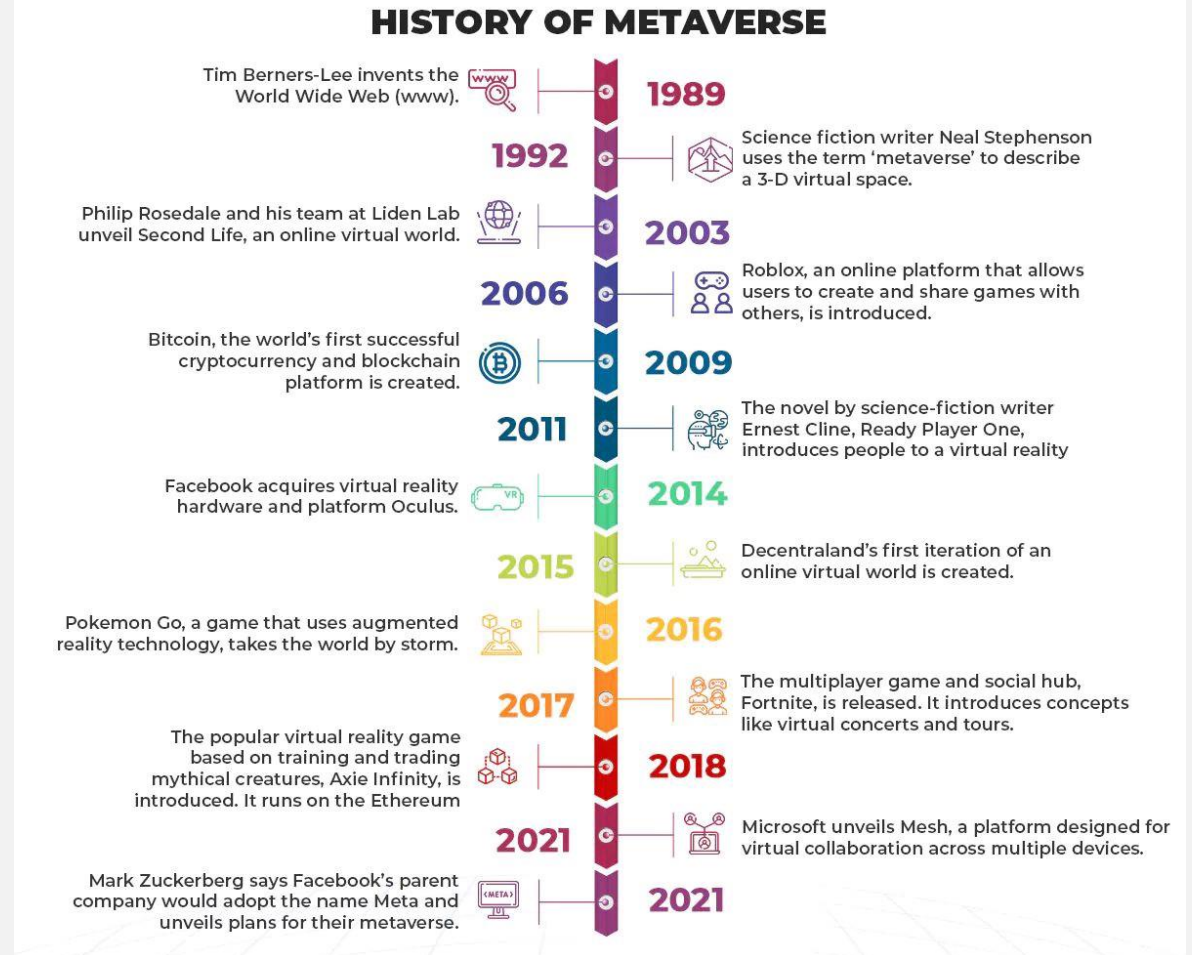
”Cobots are available today in market-places”

Metaverse - Next Version Of The Internet



THE HISTORY OF METAVERSE

The metaverse is a digital universe created by using different technologies like VR, MR, AR, cryptocurrency and the Internet. People can use the metaverse to socialise, buy products or play games, or even interact with their colleagues in a virtual metaverse office. Here are key milestones in the evolution of metaverse as it stands today.

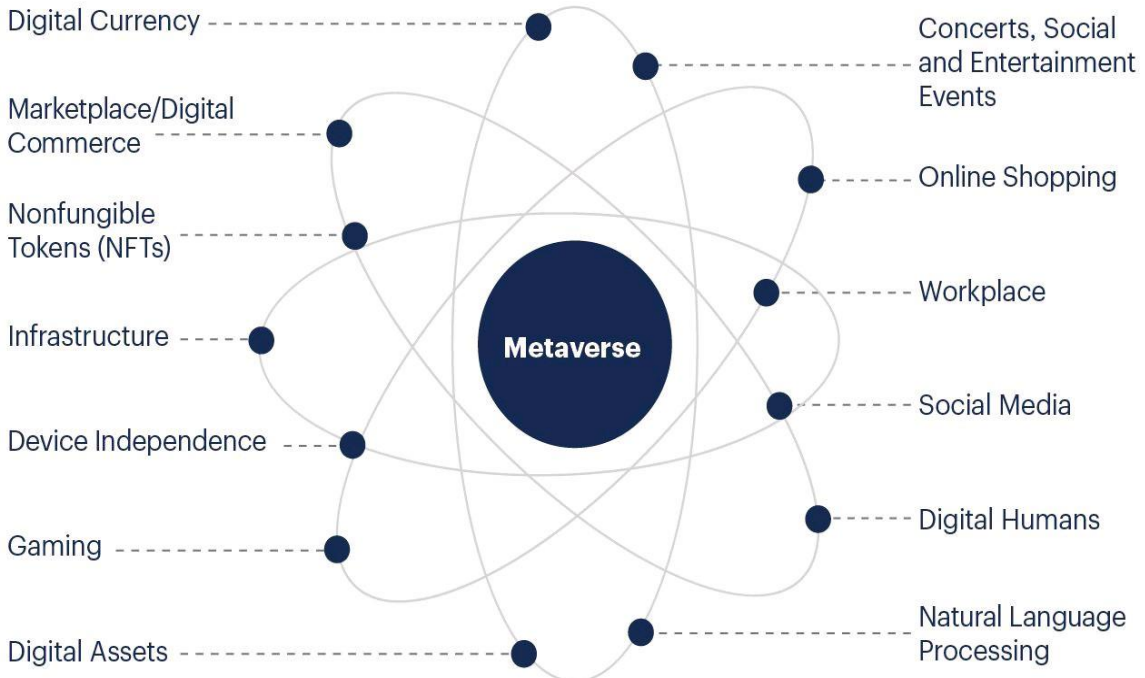



"Metaverse – the ultimate in connected immersive experience"

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Metaverse - Components

Elements of a Metaverse



gartner.com

Source: Gartner
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Decentralised Finance

User interfaces	Aggregators – provide dashboards of DeFi holdings Zapper, YAxis
DeFi protocols Essentially DeFi "products"	DeFi protocols (AKA primitives, projects, and decentralized applications ¹ or dApps) Compound, AAVE, UNISWAP
Tools	Smart contracts: used to build DeFi "products" and developed by decentralized autonomous organizations MAKER Data feeds from "Oracles": data feeds from off the blockchain ² coinbase, Chainlink
User interfaces	Wallets/Accounts DeFi – Non-custodial wallet (only self-custody) MetaMask, coinbase Wallet Sophisticated crypto traders move funds between DeFi and CeFi CeFi – Custodial account and connectivity to DeFi wallets CIRCLE, coinbase Account
Store of value/ unit of account	Digital Assets ETH, USDC, DAI, WBTC ³
Settlement layer	Blockchains Ethereum dominates by far. Others: Algorand, Polkadot, SOLANA, WBTC ³

1. A computer application that runs on a decentralized computing system and combines a smart contract and a user interface.
2. Off the blockchain (AKA off-chain), e.g., price of fiat currencies, digital assets, and equities
3. Wrapped bitcoin provides interoperability between Bitcoin and Ethereum and exists as an ERC-20 token that is backed by BTC at a 1:1 ratio.

Source: Celent

"Metaverse – a network of virtual worlds focused on social connection"

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Metaverse - Ecosystem

90+ companies building the metaverse

Software engines

Programming engines



Asset creation



Hardware interfaces

VR/AR & haptic tech



Products

Virtual worlds



Displays



Avatars



Asset marketplaces



Financial services



Examples

https://www.linkedin.com/posts/mengyaowang11_innovation-technology-food-ugcPost-6899202797435273216-LZMG/

https://www.linkedin.com/posts/sanjaykumarshah_innovation-augmentedreality-technology-activity-6887756334461161472-JxVq/

The internet is something that people "browse." But, to a degree, people can "live" in the metaverse.

" The internet is something that people "browse." But people can "live" in the metaverse"



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Balancing Act - Business & Societal Impacts

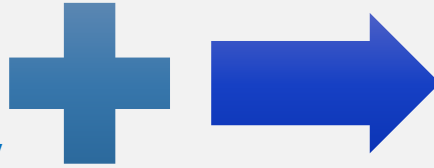
A non-profit ecosystem scalable and sustainable for social innovation.

“Connect and Be Connected”



Common Links:

- Technology Platforms
- Business Models
- Industry Experts
- Projects & Connectivity



- ✓ Awareness of ESG issues
- ✓ Access to experiential & industry knowledge
- ✓ Collective thinking on key global issues
- ✓ Purposeful Organization models to create, demonstrate & propagate results **at individual, business & community levels**

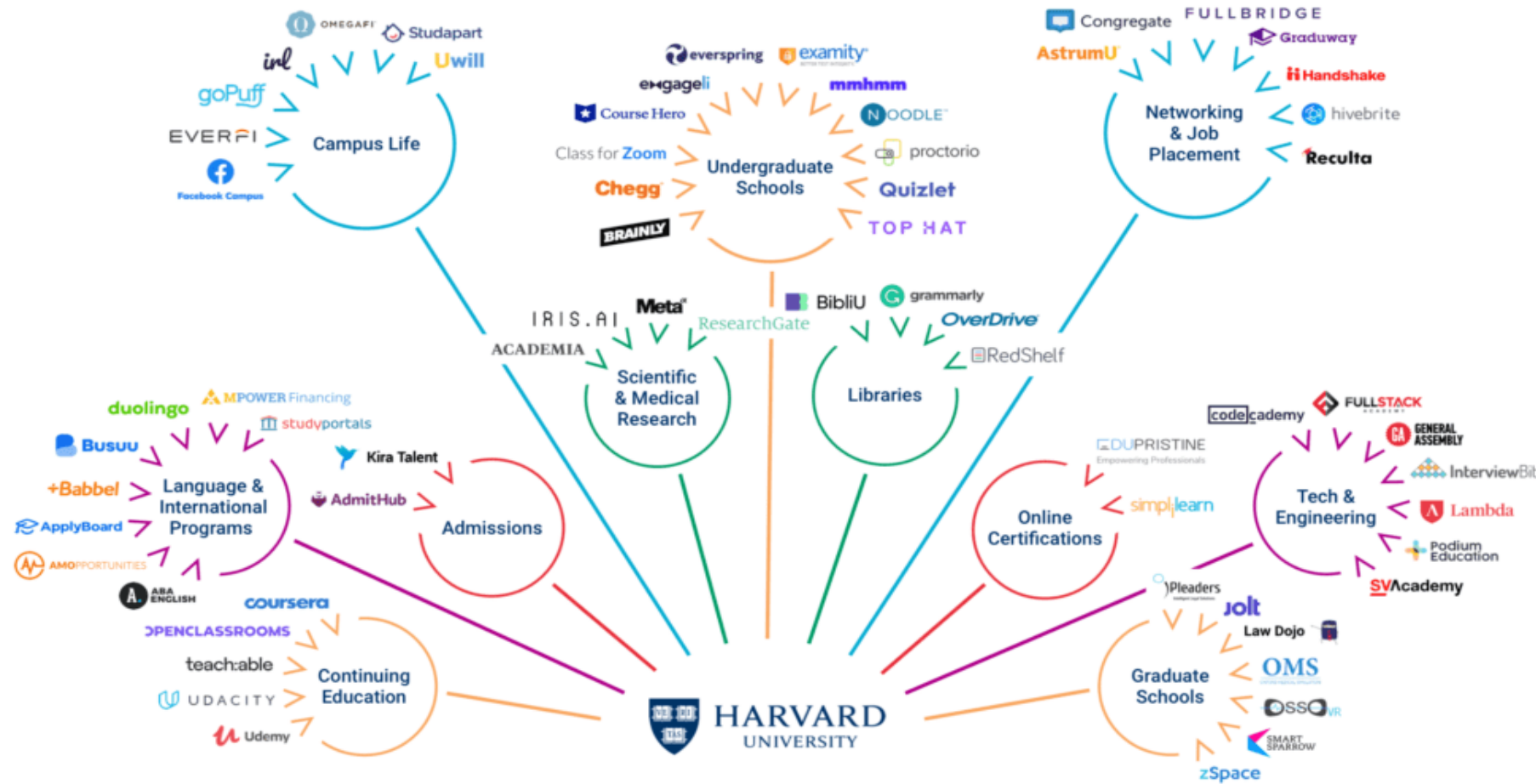
A business platform focused on ESG and leadership training & responsible digital innovation

“Aspire and Be Inspired”

Digital Future

UNBUNDLING HARVARD

Companies targeting the traditional university



Digital University Landscape in Virtual Worlds

Impact on Society



Source: Japan Business Federation

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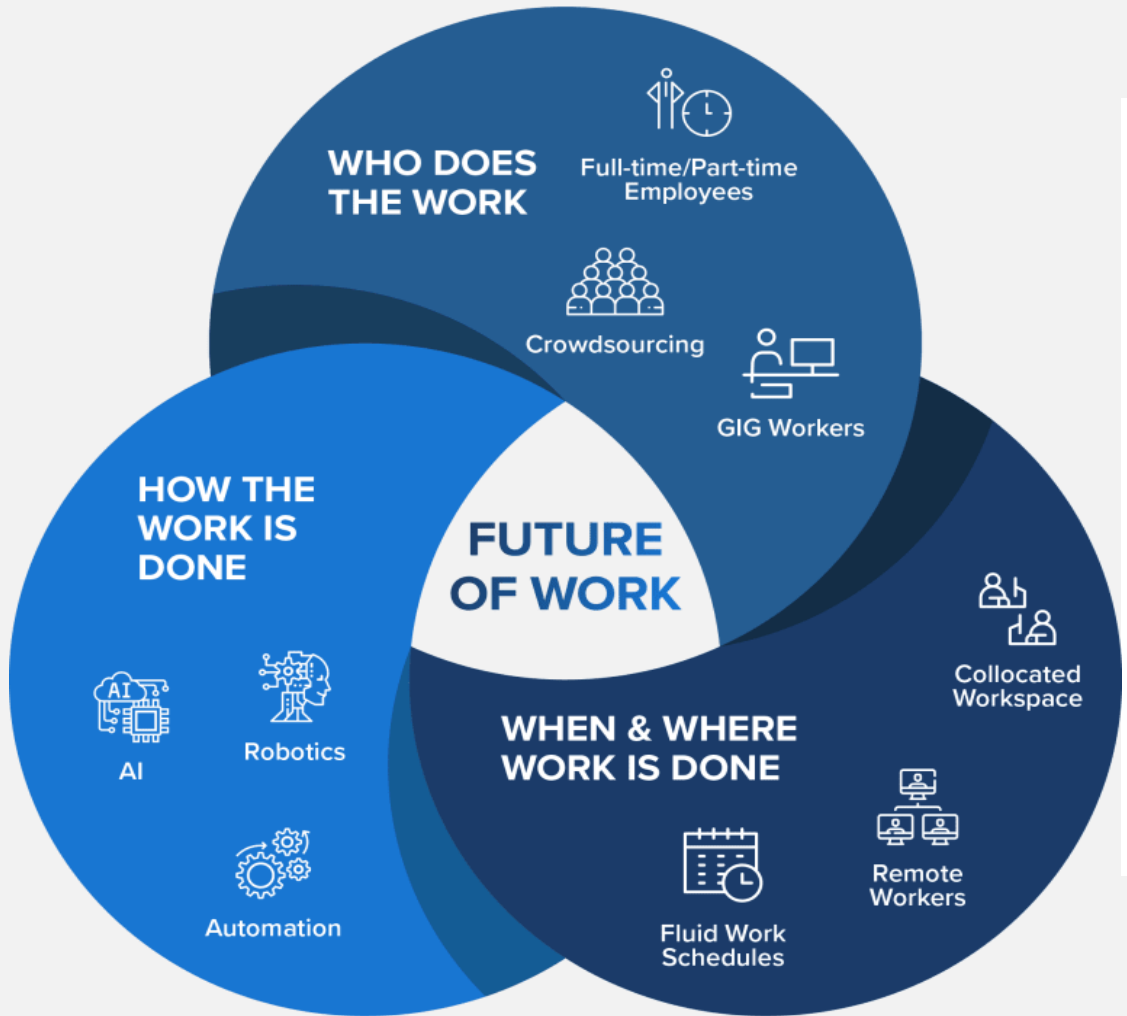


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Panel Discussion: Opportunities for Change & Challenges

Outcomes - Future of Work



Source: SHRM (The Society for Human Resource Management) Report (<https://www.shrm.org>)

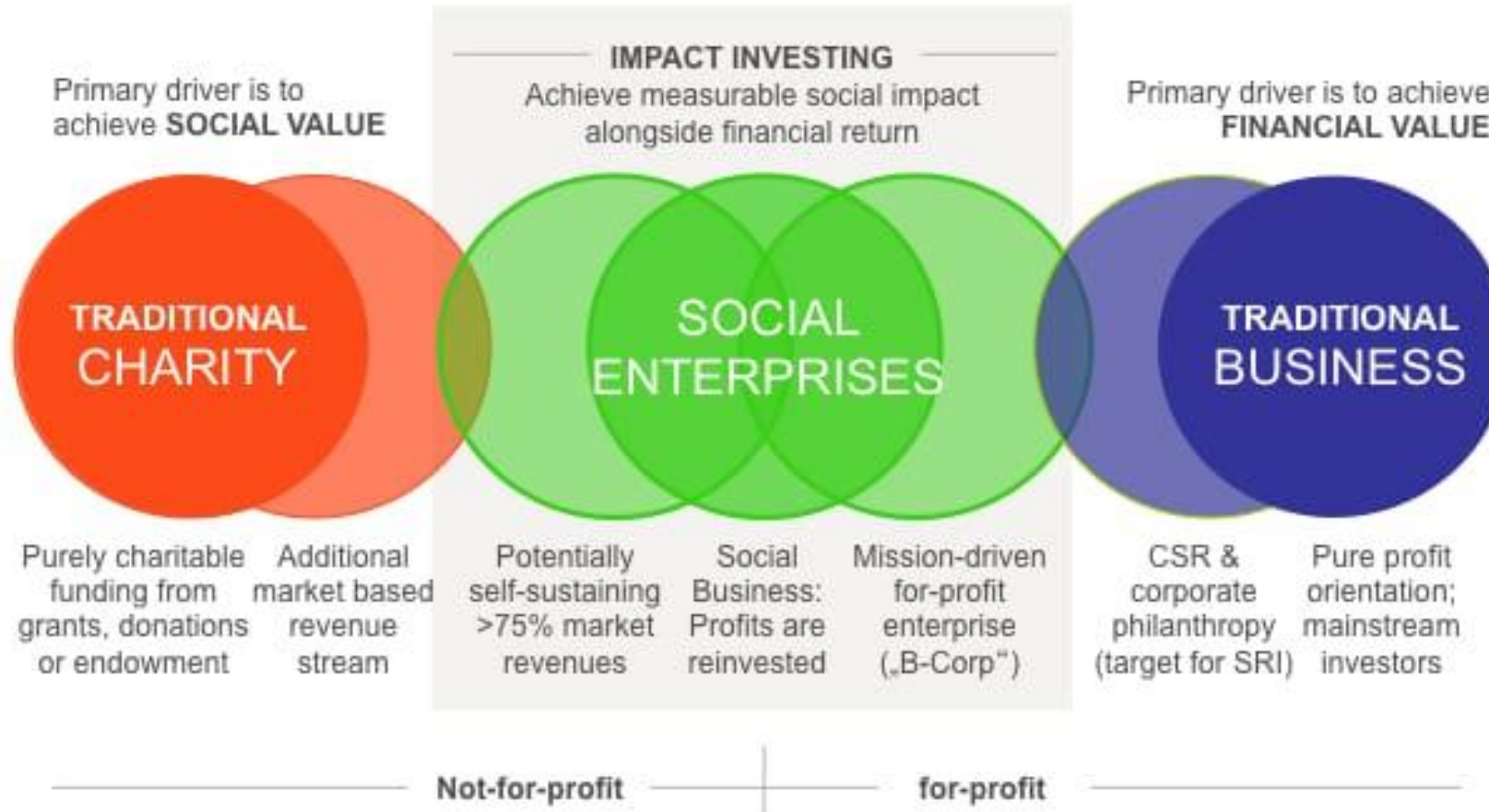
FUTURE OF THE WORKPLACE 2030+

<p style="font-size: 2em; font-weight: bold; text-align: center;">1</p> <p style="font-weight: bold; text-align: center;">The Emotional Workplace</p> <p>The emotional aspects of work: culture, wellbeing, social capital, trust.</p>	<p style="font-size: 2em; font-weight: bold; text-align: center;">2</p> <p style="font-weight: bold; text-align: center;">The Physical Workplace</p> <p>The future of physical offices; evolving roles and purpose, and whether we will even need offices in the future.</p>	<p style="font-size: 2em; font-weight: bold; text-align: center;">3</p> <p style="font-weight: bold; text-align: center;">The Technological Workplace</p> <p>How technology will foster new business models, ways to work and employee experiences.</p>	<p style="font-size: 2em; font-weight: bold; text-align: center;">4</p> <p style="font-weight: bold; text-align: center;">The Purposeful Workplace</p> <p>Evolving ideas of leadership, organisational models, value(s) and employee engagement.</p>
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Source: Unily Report (<https://www.unily.com/>)

Path Forward - Enterprises in the Future

The business model spectrum revisited



Source: Adapted from J. Kingston Venturesome, CAF Venturesome, and EVPA.

Enabling change through technology & management

- Trustworthy Technology
- Responsible Leadership

Thank you



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