The Metaverse

HBR Perspective

Technology trends and underlying technologies

Industry-agnostic trends

1 **Next-level process automation…**

Industrial IoT[1]

Robots/cobots[2]/RPA[3]

… and process virtualization

Digital twins
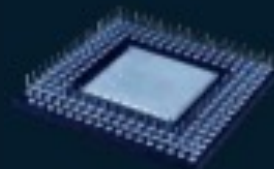
3-D/4-D printing

2 **Future of connectivity**

5G and IoT connectivity

3 **Distributed infrastructure**

Cloud and edge computing

4 **Next-generation computing**

Quantum computing

Neuromorphic chips (ASICs[4])

5 **Applied AI**

Computer vision, natural-language processing, and speech technology

6 **Future of programming**

Software 2.0

7 **Trust architecture**

Zero-trust security

Blockchain

Industry-specific trends

8 **Bio Revolution**

Biomolecules/"-omics"/ biosystems

Biomachines/biocomputing/augmentation

9 **Next-generation materials**

Nanomaterials, graphene and 2-D materials, molybdenum disulfide nanoparticles

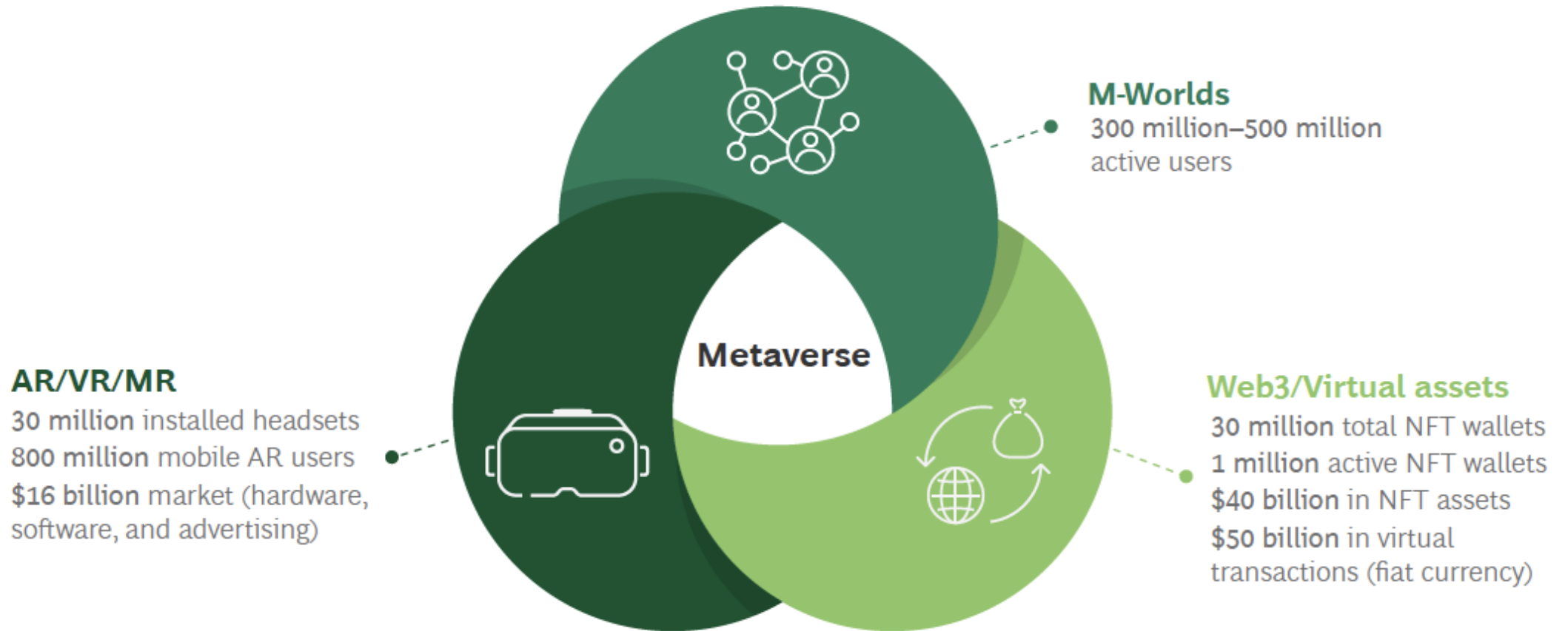**10** **Future of clean technologies**

Nuclear fusion

Smart distribution/metering

Battery/battery storage

Carbon-neutral energy generation

The Metaverse Lies at the Intersection of Three Technologies and User Bases

M-Worlds
300 million–500 million active users

AR/VR/MR
30 million installed headsets
800 million mobile AR users
$16 billion market (hardware, software, and advertising)

Metaverse

Web3/Virtual assets
30 million total NFT wallets
1 million active NFT wallets
$40 billion in NFT assets
$50 billion in virtual transactions (fiat currency)

Sources: Matthew Ball; Bloomberg; ARtillery Intelligence; Binance Research; BCG analysis.

Note: 2021 figures.

Consumer behavior is evolving, necessitating shifts in sales and marketing

Changing consumer expectations

80%

Of consumers say they are **more likely to do business** with a company if it **offers personalized experiences**

64%

Of consumers expect companies to **respond and interact with them in real time**

E-comm growth

19.5%

Of total global retail sales are through e-comm (up from 13.6% in 2019)

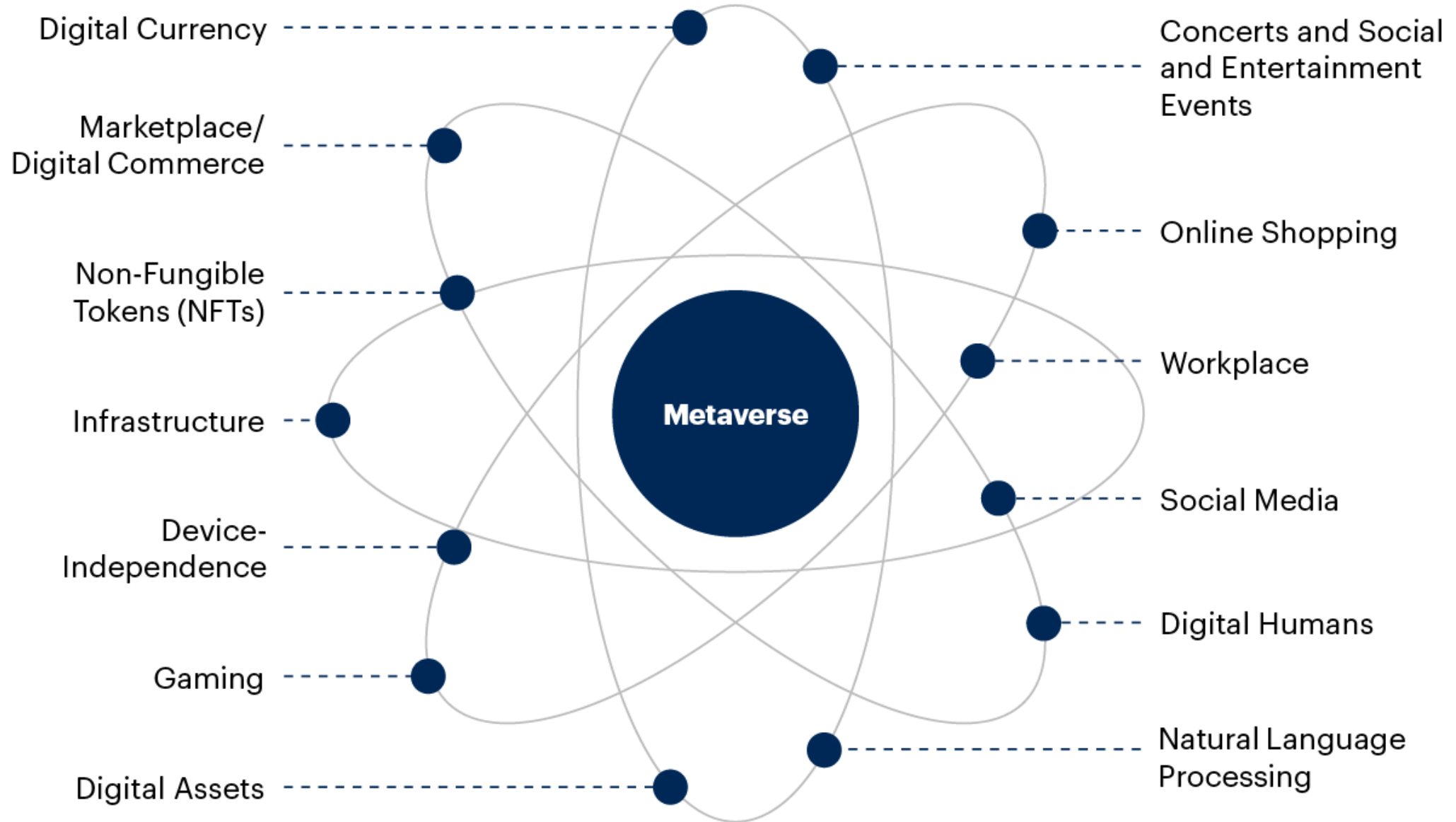## New channels emerging

37%

Projected CAGR of intelligent virtual-assistant market size from 2020 to 2027

$1.3Tn

Expected **market for the metaverse**[1] by 2030 (40%+ CAGR)

Elements of a Metaverse

Digital Currency

Marketplace/
Digital Commerce

Non-Fungible
Tokens (NFTs)

Infrastructure

Device-
Independence

Gaming

Digital Assets

Metaverse

Concerts and Social
and Entertainment
Events

Online Shopping

Workplace

Social Media

Digital Humans

Natural Language
Processing

The Six Attributes of M-Worlds

Persistent

Continuous, nonpausing, non-resetting, and always accessible

Synchronous and live

Consistent, real-time living experiences for all users with seamless interoperability

Concurrent

Multiple individuals, businesses, and objects operating simultaneously and in parallel

Immersive

Highly involved and interactive experiences spanning both the physical and digital worlds

Functioning economy

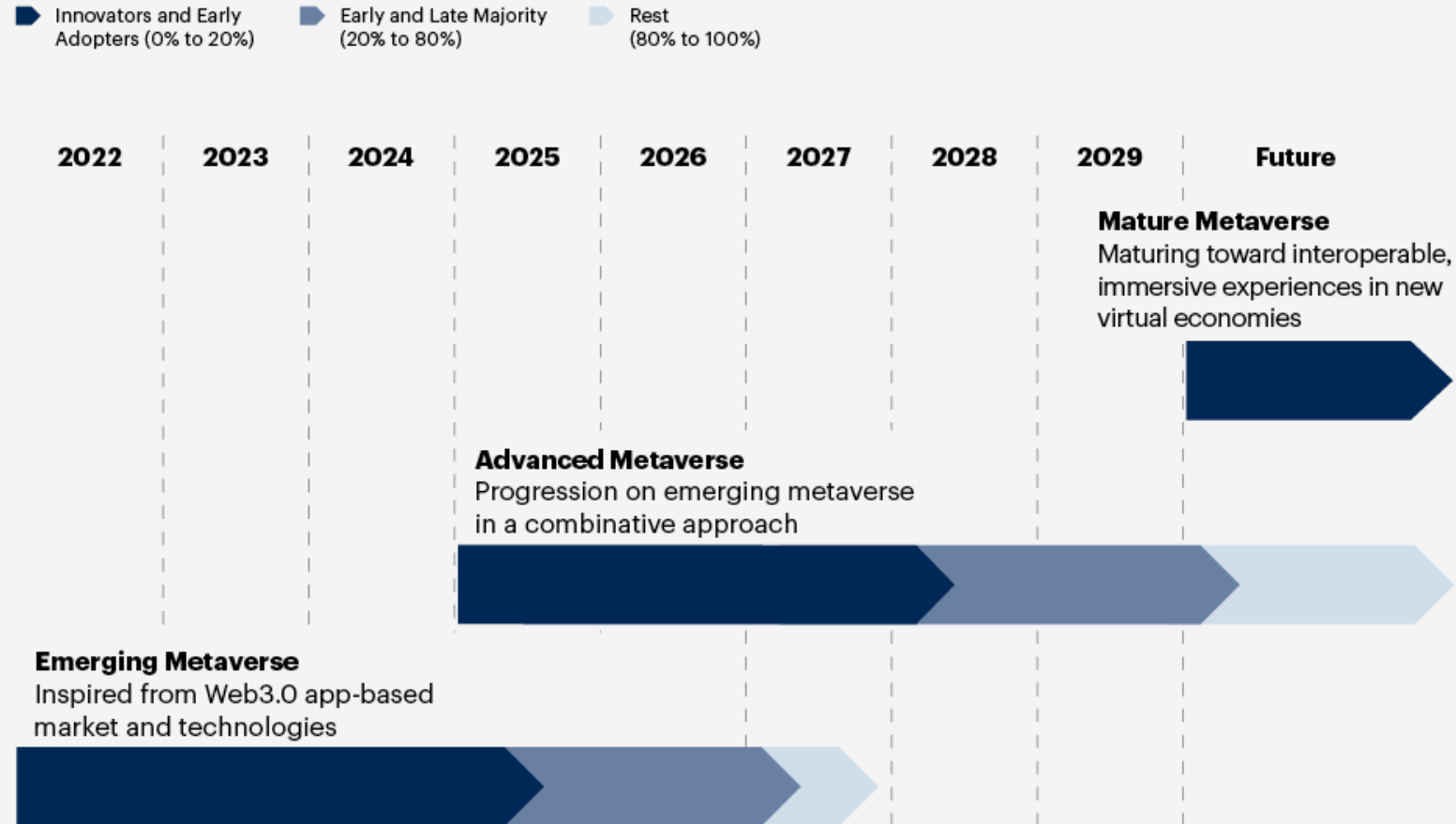Participants can create, own, buy, and sell physical and digital assets and services
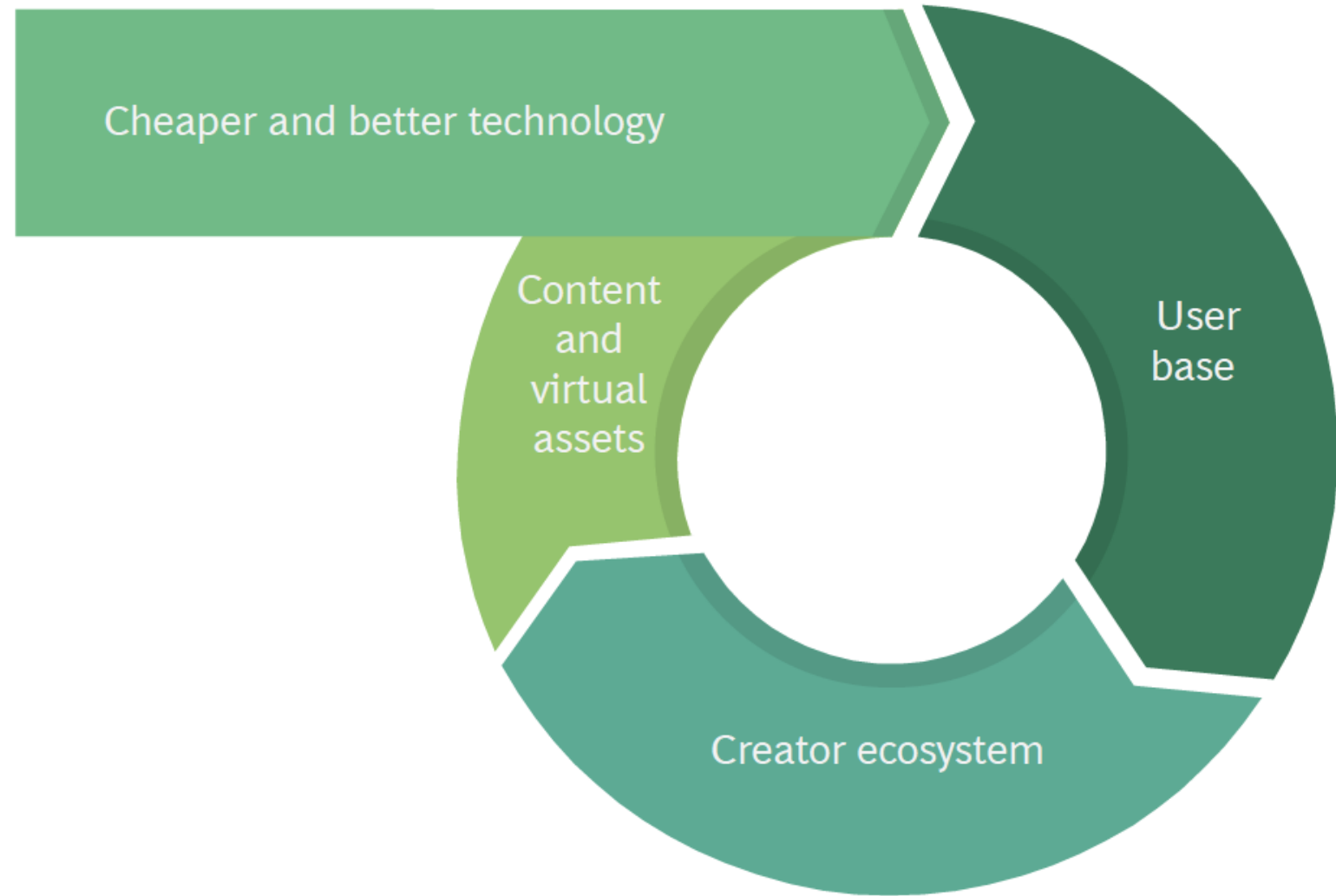
Multiple contributors

Independent and commercially and noncommercially focused

Evolution Spectrum for the Metaverse

■ Innovators and Early
Adopters (0% to 20%)

■ Early and Late Majority
(20% to 80%)

□ Rest
(80% to 100%)

2022   2023   2024   2025   2026   2027   2028   2029   Future

Mature Metaverse
Maturing toward interoperable,
immersive experiences in new
virtual economies

Advanced Metaverse
Progression on emerging metaverse
in a combinative approach

Emerging Metaverse
Inspired from Web3.0 app-based
market and technologies

Gartner.

The Metaverse Flywheel

What can executives do today?

Don't underestimate the potential

Take the long view

Focus on demand and what motivates users

Commit to a "responsible metaverse"

Formulate a metaverse strategy but keep it flexible enough to adapt to changes in technology and consumer preferences. Adopt a "test and learn" approach for both consumer facing and enterprise functions.

Given the mainstream metaverse and corresponding revenue generation are likely several years out, companies should take a long-term view on investments and consider KPIs around consumer and employee engagement in addition to ROI. Consider investments in the context of broader digital transformation agendas.

Organizations should focus on how to create captivating content and engaging experiences (*e.g.*, exclusive partnerships, user generated content tools, robust data and insights collection) in order to establish share and remain competitive.

Organizations should manage a range of complexities and risks in the metaverse (*e.g.*, privacy/security, accessibility, sustainable energy consumption) and ensure they are proactively building a "responsible metaverse" and effectively maintaining consumer and employee trust.

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