



AI BusinessTM

AIによる真のビジネスへの影響

The true business impact of AI

ダニエル・ピッチフォード

AI Business

ディレクター

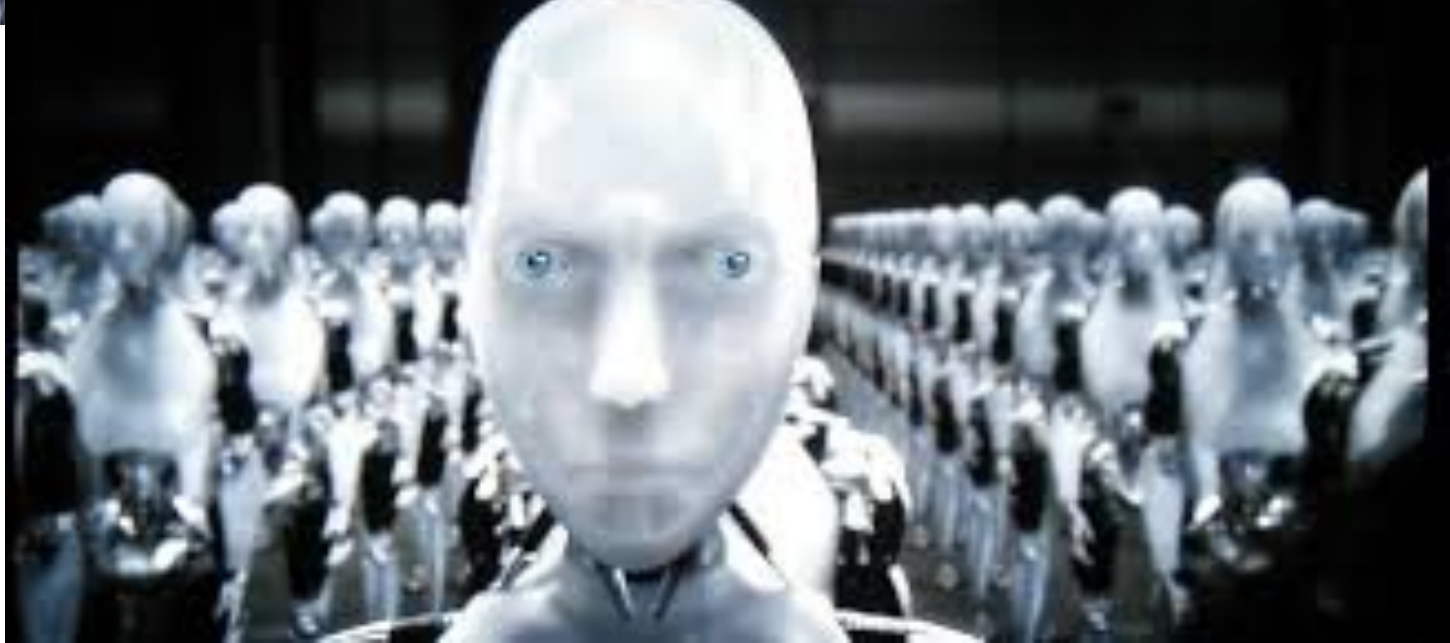
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ビジネス機会 1/2

事務業務の自動化

- 連絡センター - 顧客対応アプリケーション「B2C」
- 膨大なデータ量の処理 - 自動化されたプロセスと予測分析
- レポート作成 - 数値アプリケーション / 自然言語アプリケーション
- ネットワークパフォーマンスの監視 - 人同士のやり取りを介さない自動化された解決フロー
- サイバー攻撃の防止 - 不正検知、予防、より堅固なファイアウォール

3億5700万ドル - 2016年に世界中の企業がAIに投資した金額

The Opportunity for Business 1/2

Automating clerical tasks

- Contact centres - customer facing applications B2C
- Processing vast amounts of data - automated process and predictive analytics
- Formulating reports - numerical applications / natural language applications
- Monitoring network performance - automated resolutions without human interaction
- Preventing cyber attacks - Fraud detection, prevention, more robust firewalls



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\$357 million - Worldwide Enterprise AI Investment in 2016 *Tractica

ビジネス機会2/2

複雑な業務の強化

- 人の行動を予測して意思決定を強化する
- 人の介入を最小限に抑え、精度を高めて、組織の事業活動を強化する
- 顧客体験と製品ジャーニーを向上させる
- 収益の拡大 - 新製品のリードタイムを短縮する

310億万ドル - 2025年までに世界中の企業がAIに投資する金額

The Opportunity for Business 2/2

Enhancing more complex tasks

- Predicting human behaviour and enhancing decision-making
- Enhancing organisational operations by minimizing human intervention and increasing accuracy.
- Improving the customer experience and product journey
- Increase Revenues - Speeding up time to market for new products.



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\$31 billion - Worldwide Enterprise AI Investment by 2025 *Tractica

AIを活用する企業:現状

- ▶ 3本の柱:ビッグデータと処理能力の進歩は、過去数年間のAIの大きな進歩を可能にした。
- ▶ AIのエンタープライズアプリケーションの年間収益は、2016年の3億5800万ドルから、2025年までに312億ドル超に拡大する。
- ▶ 現在の実装率は全体的な潜在性の20%~35%を占めている。
- ▶ AI Businessは、2016年にFTSE100企業とFortune 500企業を調査し、そのうちの32%がAIを何らかの形で導入済みであることが判明した。

AI-enabled Enterprise: Current State of Play

- ▶ **3 Pillars:** Advances in Big Data and processing capabilities have made the huge advances in AI of the last couple of years possible
- ▶ Annual revenue for enterprise applications of AI will increase from \$358 million in 2016 to over \$31.2bn by 2025.
- ▶ Current implementation rates are 20%-35% of overall potential
- ▶ AI Business researched FTSE100 and Fortune 500 organisations in 2016 and found that 32% are already implementing some form of AI

AIを活用する企業:現状



























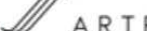





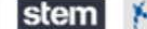














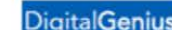

AI-enabled Enterprise: Current State of Play

- ▶ 82%が今後12～18ヶ月以内に導入を計画中。
 - ▶ 現在の理解によると、75%が機械学習アプリケーションとディープラーニングアプリケーションに、45%がNLPに、15%が画像認識技術にそれぞれ投資している。
 - ▶ AIをいち早く採用し推進している業界として、金融サービス、輸送、製造、小売がある。
 - ▶ 法律、ヘルスケア、通信の業界もAIにかなりの投資を行っている。その多くは、ロボットや自動化の能力を最も進歩させた統合プロジェクトである。
-
- ▶ 82% are planning to do so within the next 12-18 months
 - ▶ From current uptake, 75% are investing in machine and deep learning applications, 45% in NLP and 15% in image recognition technologies.
 - ▶ Financial Services, Transport, Manufacturing, and Retail among the earliest adopters and advocates of AI
 - ▶ Legal, Healthcare and Telco are also investing heavily in AI, many in joint projects that also make the most of advances in robotics and automation capabilities.

投資 Investment

- ▶ Global EquityのAIへの投資額は現在6百万ドル超であり、過去5年間で700%の増額を示している
 - ▶ 1,000件超の取引はスタートアップ機会がかなり多いことを意味している
 - ▶ 投資の65%はSeedまたはSeries Aで行われている
 - ▶ 企業投資家は10億ドル超の投資を行うことにより、VCへの投資に暗い影を投げかけている
-
- ▶ Global Equity funding in AI now over \$6 billion representing a 700% increase over the past 5 years
 - ▶ Over 1,000 deals meaning the start-up opportunity is hot
 - ▶ 65% of investments are made at Seed or Series A
 - ▶ Corporate Investors overshadowing VC investment with more than \$1 billion invested

投資 Investment

| Investor | Rank | Select Investments |
|------------------|------|--|
| Intel Capital | 1 |                |
| Google Ventures | 2 |           |
| GE Ventures | 3 |          |
| Samsung Ventures | 4 |        |
| Bloomberg Beta | 4 |         |

最も人気の高い分野 Hottest Areas

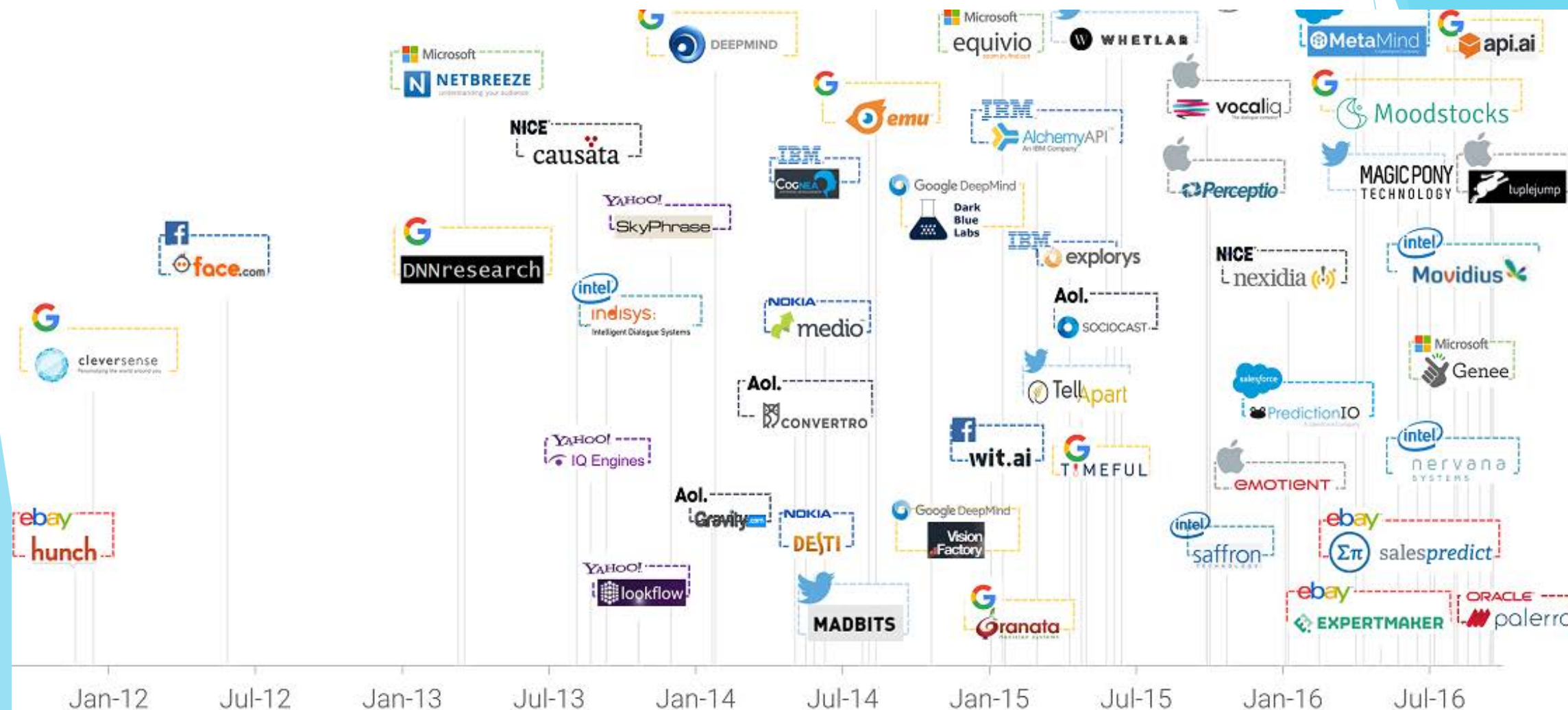
ヘルスケアに特化した企業は、過去2年間で5千億ドル超の投資をスタートアップ企業に対して行い、トップを走っている

Healthcare focused companies leading the way with more than \$500m of start-up investment in the past 2 years

| Sub-Industry | 2011 | 2012 | 2013 | 2014 | 2015 | 2016(YTD) |
|----------------------------------|--------|--------|--------|--------|--------|-----------|
| Healthcare | Yellow | Orange | Orange | Red | Red | Red |
| Advertising, Sales & Marketing | Orange | Orange | Orange | Orange | Red | Orange |
| Business Intelligence | Yellow | Yellow | Orange | Orange | Red | Orange |
| Security | Yellow | Green | Yellow | Orange | Orange | Yellow |
| Finance | Green | Green | Yellow | Orange | Yellow | Orange |
| IoT/Wearables | Green | Green | Yellow | Orange | Orange | Orange |
| Education | Green | Yellow | Yellow | Green | Yellow | Green |
| Customer Relationship Management | Green | Green | Green | Yellow | Yellow | Yellow |
| Personal Assistants/Productivity | Green | Green | Green | Green | Yellow | Yellow |
| E-Commerce | Green | Green | Green | Green | Yellow | Green |
| Robotics | Green | Green | Green | Green | Yellow | Green |

AIのM&A競争

The Acquisition Race



最高情報責任者の主張 What the CIOs are saying

- ▶ 今後3～5年の新技術への投資を検討する際、AIは議題のトップにある。
 - ▶ 現在のアプリケーションごとの支出は、10万ドルから20万ドルの範囲であるが、今後3年間で100万ドル超に増加されようとしている。
 - ▶ 現在は、企業内の効率性の改善、コスト削減、想像力の向上に焦点が当てられている。
 - ▶ 最も人気のある技術は、機械学習、画像認識、NLP、RPAである。
-
- ▶ AI is top of the agenda when looking at new technology investment over the next 3-5 years.
 - ▶ Current spending per application ranges from \$100k-\$200k but is set to increase to over \$1m over the next 3 years.
 - ▶ Current focus is on improving efficiencies, reducing costs, and improving creativity within the business.
 - ▶ Hottest technologies are Machine Learning, Image recognition, NLP, and RPA.

最高情報責任者の主張 What the CIOs are saying

- ▶ 顧客サービスは、一番の機会が見い出される最上位分野としてランク付けされている。マーケティング、販売、プロセス管理がこれに続いている。
- ▶ 最高情報責任者が見る、AI実装を通じて組織に影響を及ぼす最も関連の深い問題の中に、失業とデータプライバシーが含まれている。
- ▶ AIに関する最終的な意思決定は、最高情報責任者、最高技術責任者、分析/データ責任者、ビジネスユニット責任者などの複数の役職の間で今もなお行われている。
- ▶ Customer service ranks as the top area of the business where they see the biggest opportunity, followed by Marketing, Sales, and Process Management.
- ▶ Unemployment and data privacy are among the most pertinent issues CIOs see affecting their organization through implementing AI
- ▶ Ultimate decision making on AI still sits between multiple roles including, the CIO, CTO, Head of Analytics/Data, and Business Unit Leads.

主要な産業用途 Key Industry Applications

- ▶ **金融サービス** - 顧客ケアや不正予防からアルゴリズム取引にいたるまで、金融サービス分野は、AI戦略の策定に最も多額の投資をすでに行っている。
 - ▶ **製薬** - 新薬の発見。Pfizerは認知プラットフォームを用いて新しいがん治療を探したり、新しい治療や治療法の発見を加速化したりするために、IBM Watsonとパートナーとなって協業した。
 - ▶ **小売** - 顧客体験: 米国Bloomingdalesは高度な分析にAIの能力を用いて、超個別化された顧客ジャーニーを提供している。
 - ▶ **輸送** - 消費者向け自動車から物流/貨物輸送/出荷物配送にいたるまで、この分野全体が大きな転換を迎えようとしている。
 - ▶ **法律** - Deloitteは、イギリスだけでも法律分野で110,000超の仕事が2020年までに置き換えられると考えている。
-
- ▶ **Financial Services** - From Customer Care through to Fraud Prevention and Algorithmic trading; the financial services sector has seen the largest investment already made into developing an AI strategy.
 - ▶ **Pharmaceuticals** - Drug discovery; Pfizer partnered with IBM Watson to use their cognitive platform to search for new cancer treatments and accelerate the identification of new treatments and therapies.
 - ▶ **Retail** - Customer experience; In the U.S Bloomingdales are utilizing AI's capabilities for advanced analytics to provider a hyper-personalized customer journey
 - ▶ **Transport** - from Consumer Automotive through to logistics/freighting/delivery of shipments; the sector as a whole will see a huge transformation
 - ▶ **Legal Sector** - Deloitte believes in the UK alone over 110,000 jobs will be displaced by 2020 in the legal sector.

開始する Getting Started

意思決定/計画ステージ

AI戦略の設定は今日の企業にとって極めて重要:

- ▶ 組織内のどこから開始するか決定する
- ▶ プロジェクトと実装を主導する部署に責任を一任する
- ▶ 理事会が方向付けからデリバリーまでのプロセスに確実に関与するようにする

Decision-making & planning stages

Setting an AI strategy is vital for today's enterprise:

- ▶ Decide where to start within the organisation
- ▶ Allocate responsibility to a department for heading the project and implementation
- ▶ Ensure the board is involved in the process from inception to delivery

開始する Getting Started

意思決定/計画ステージ

AI戦略の設定は今日の企業にとって極めて重要:

- ▶ 新しい専門家の募集を計画する
- ▶ 適正パートナーを選ぶ - 刻一刻とさらに多くのパートナーが誕生する！
- ▶ 現実的なタイムスケールと望みの成果を踏まえて、特定のパイロットプロジェクトを設定する

Decision-making & planning stages

Setting an AI strategy is vital for today's enterprise:

- ▶ Plan for the recruitment of new expertise
- ▶ Choose the right partner - there's many and more are born every minute!
- ▶ Set specific pilot projects and with realistic time-scales and desired outcomes



AI BusinessTM

- ▶ 企業向け人工知能に関する世界有数のニュースポータルとオンラインコミュニティ
 - ▶ www.aibusiness.com
 - ▶ Twitterハンドル名(5万以上のフォロワー): @business_AI
 - ▶ LinkedInグループ: ビジネス向け人工知能
 - ▶ Facebookページ: ビジネス向け人工知能 (facebook.com/aibusinessnews)
 - ▶ YouTube: AIB TV
-
- ▶ The world's leading news portal and online community on Artificial Intelligence for enterprises
 - ▶ www.aibusiness.com
 - ▶ Twitter Handle (50k+ followers): @business AI
 - ▶ LinkedIn Group: Artificial Intelligence for Business
 - ▶ Facebook Page: Artificial Intelligence for Business (facebook.com/aibusinessnews)
 - ▶ YouTube: AIB TV



The AI Summit

- ▶ 人工知能に関心のあるビジネスのプロを対象とした世界初にして最大のイベントシリーズ
 - ▶ ロンドン、サンフランシスコ、ニューヨーク、東京、香港で開催されるサミット
 - ▶ www.theaisummit.com
-
- ▶ The world's first and largest event series for business professionals with an interest in Artificial Intelligence
 - ▶ Summits in London, San Francisco, New York, Tokyo, and Hong Kong
 - ▶ www.theaisummit.com



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ありがとうございました。

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Thank you,

Daniel Pitchford

Director

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Artificial Intelligence Market Outlook

Market Trends to Watch, Key Industries and Use Cases,
and Technology Evolution



CLINT WHEELLOCK
Managing Director



Sector Focus

- Artificial Intelligence
- Robotics
- User Interface Technologies
- Wearable Devices
- Digital Health

Tractica is a market intelligence firm that focuses on human interaction with technology.

The firm's market research and consulting services provide industry participants and stakeholders with in-depth analysis of emerging technology trends, business issues, market drivers, and end-user demand dynamics across multiple application domains.

Research Services

- Research Reports
- Research Subscriptions
- Analyst Inquiry Sessions
- Consulting Projects
- Go-to-Market Services
- End-User Surveys



AI Market Trends and Drivers

10 Trends to Watch in 2017 and Beyond



1. AI implementations will be focused on incremental improvements in the short term, but its transformative potential should not be ignored.
2. Virtually all AI implementations will be narrow AI.
3. Deep learning will be the most important AI technology.
4. Semi-supervised AI will gain traction.
5. A top-heavy and long-tail ecosystem is emerging for AI.
6. The era of GPU dominance in the AI market will end.
7. AI will impact almost every industry.
8. Human perception is a bigger driver for AI than Big Data.
9. Professional services are the next big emerging opportunity in AI.
10. AI czars will be part of government by 2020.

MARKET DRIVERS

- Explosion in the volume of available data
- Technological advances in algorithms
- Greater degree of consistency compared to natural intelligence
- Automation trend across all industries
- Economic benefits of workforce automation

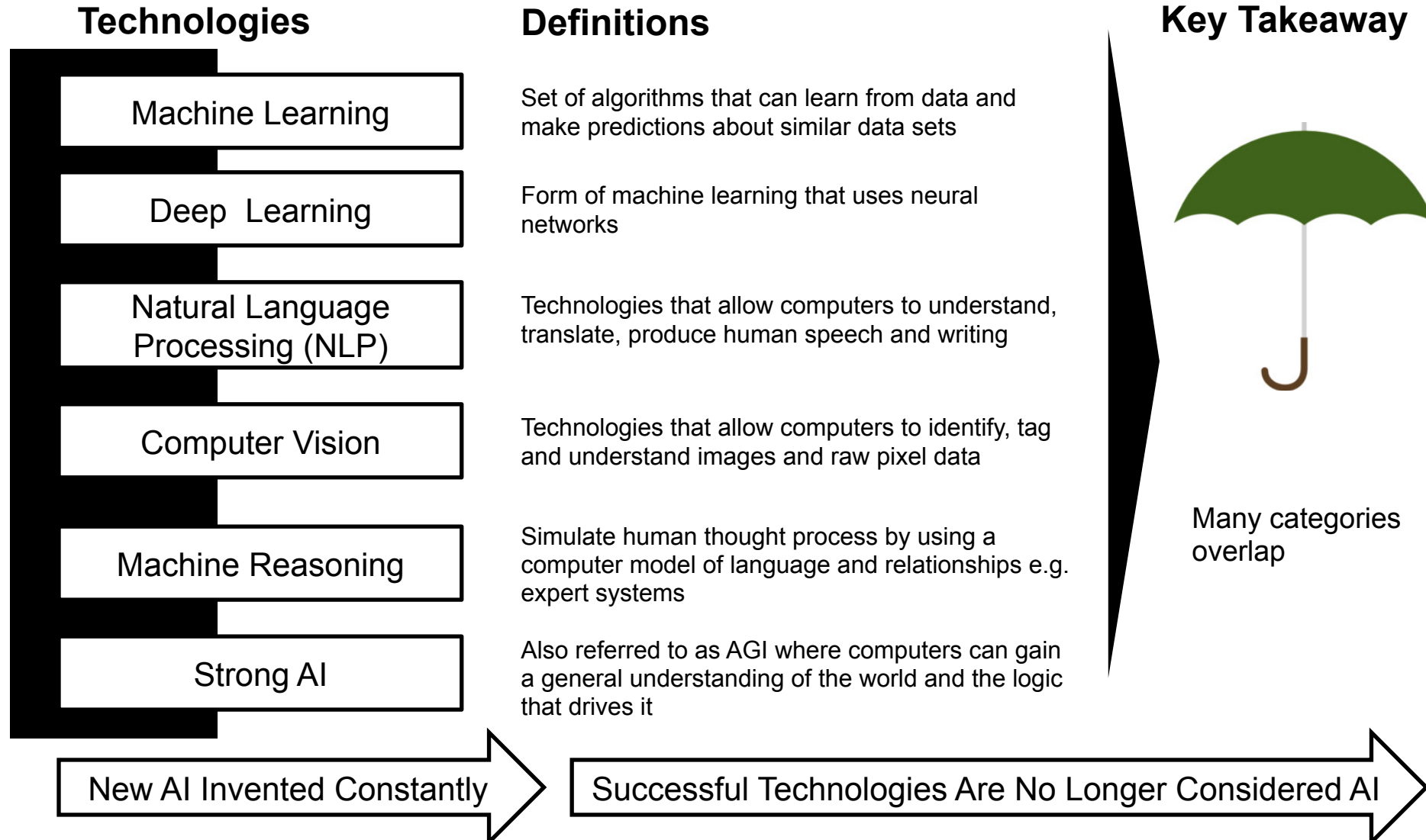
MARKET BARRIERS

- Over-hyped and over-sold
- Unrealistic expectations
- Social controversy
- Societal backlash
- Need for accurate data
- The infancy of neuroscience
- Lack of experienced talent

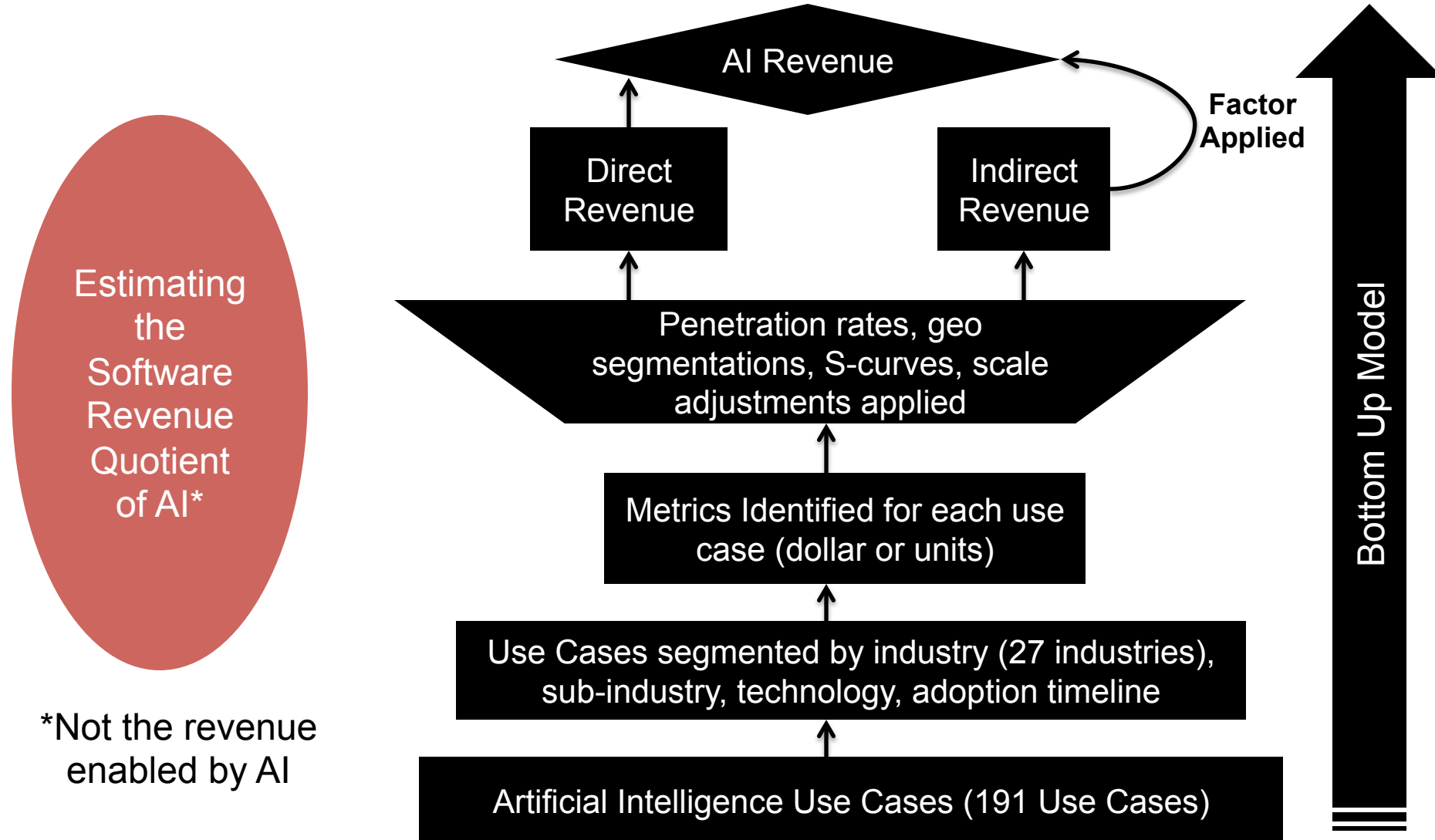


Definitions and Methodology

AI is a Loose Umbrella Term for Technologies Inspired by Biological Systems



Forecast Model Methodology





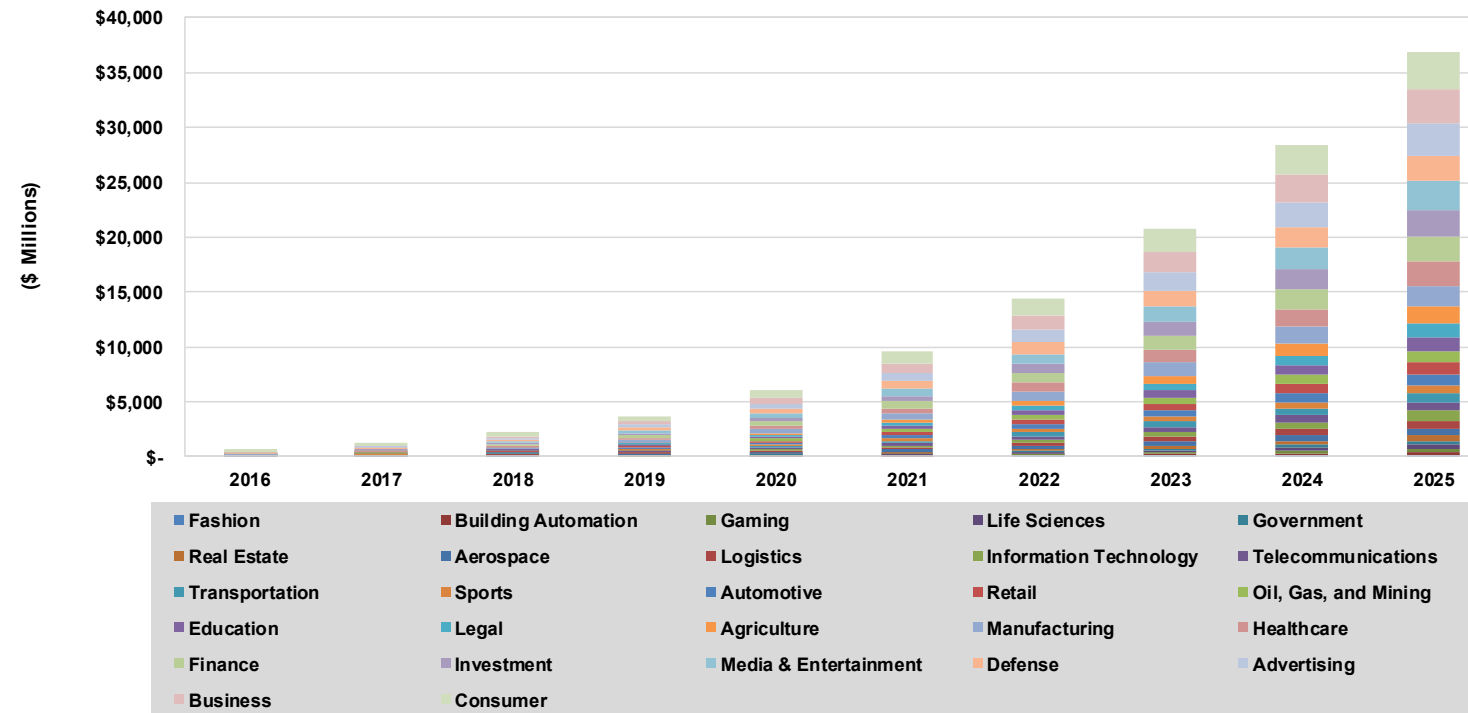
Industries and Use Cases

Total AI Software Revenue



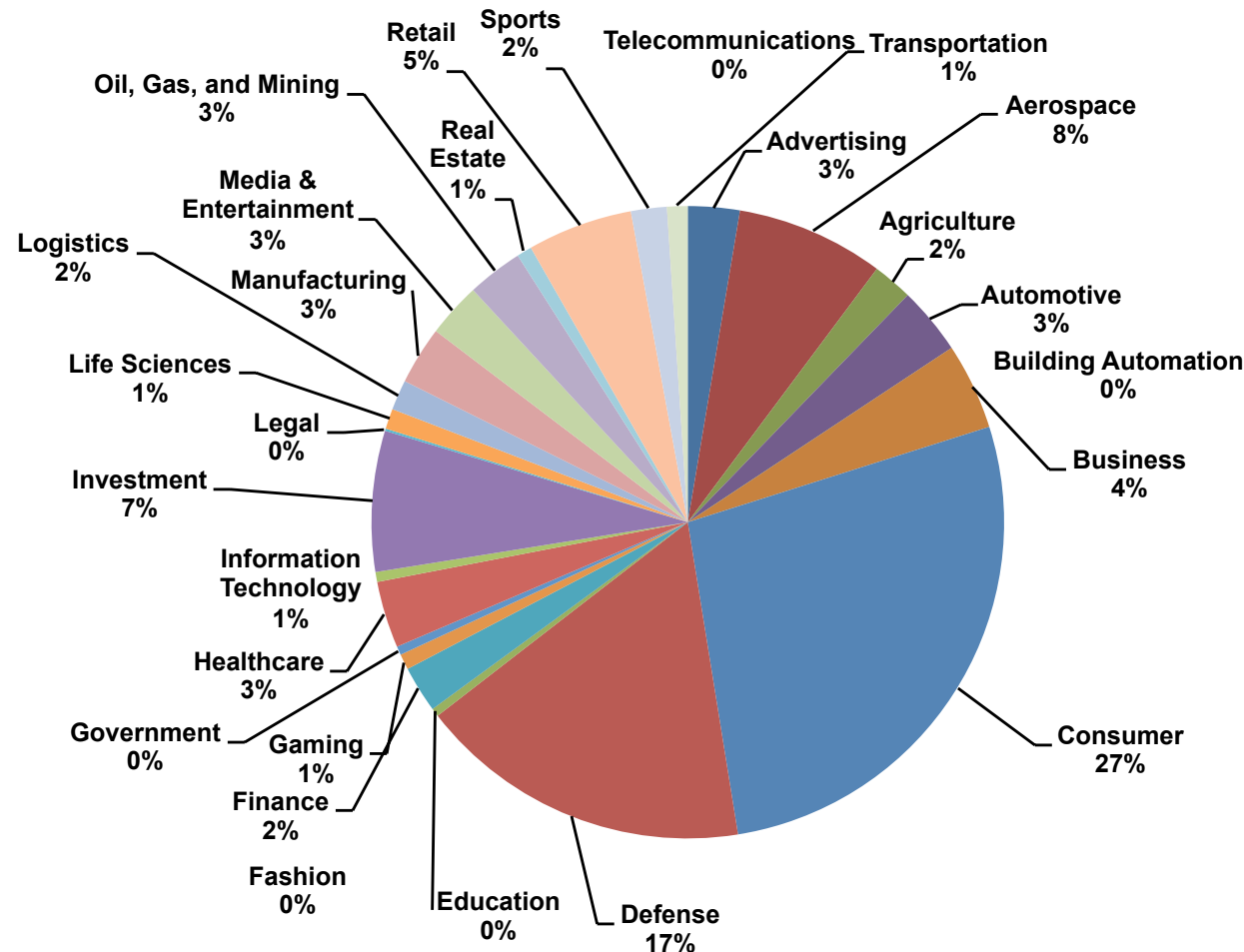
Worldwide AI software revenues will grow from \$643.7 million in 2016 to \$36.8 billion by 2025, representing a CAGR of 56.8%

Artificial Intelligence Revenue by Industry, World Markets: 2016-2025



(Source: Tractica)

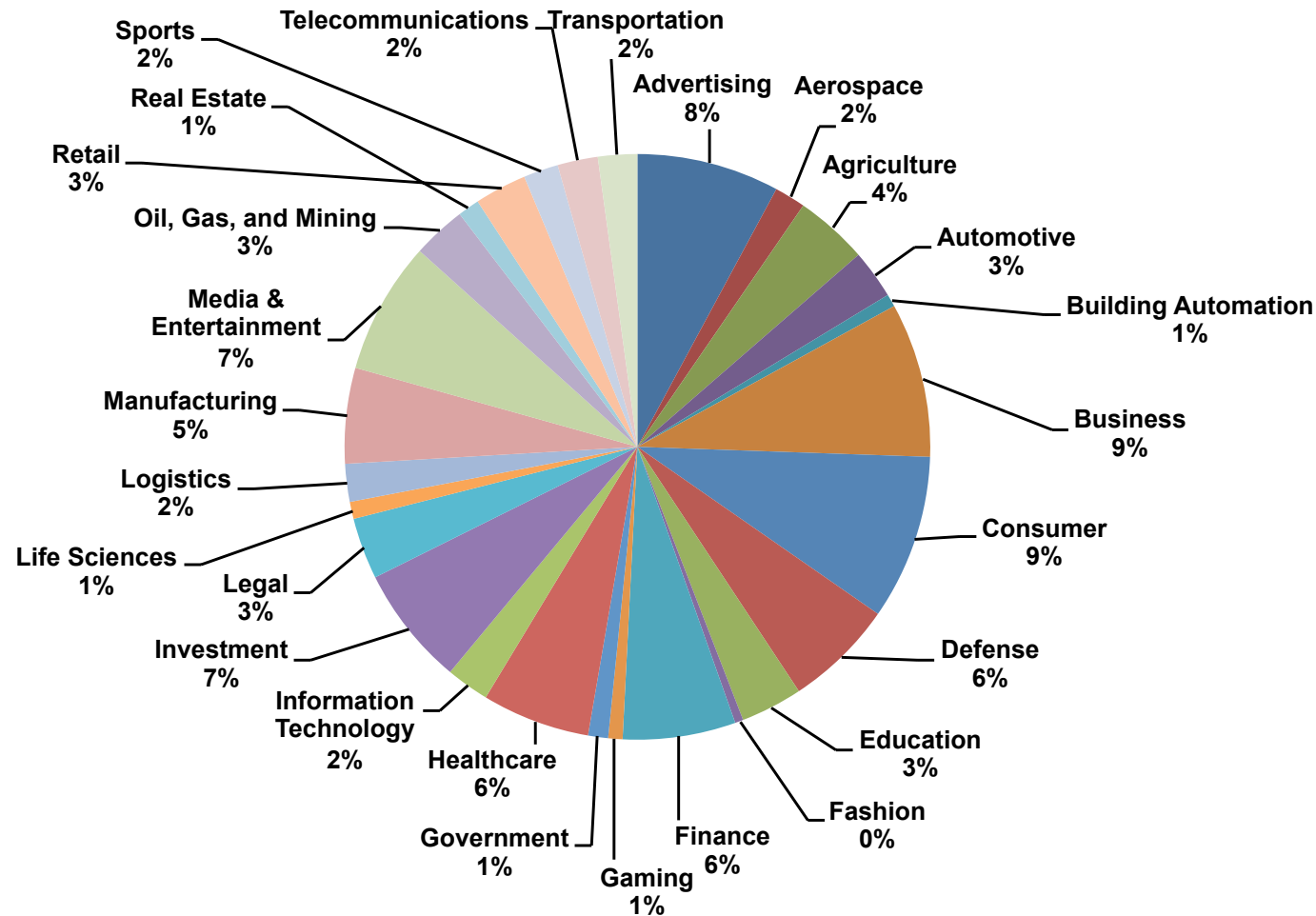
AI Revenue by Industry: 2016



(Source: Tractica)

- In 2016, AI software revenue was led by consumer and defense industries
- Amazon (recommendations, Alexa), Google (search, bots, images, voice), Facebook (feeds, images), Apple (Siri, Photos)
- Enterprise AI is still 56% of spend – business, investment, automotive, manufacturing, advertising, aerospace are driving spending

AI Revenue by Industry: 2025



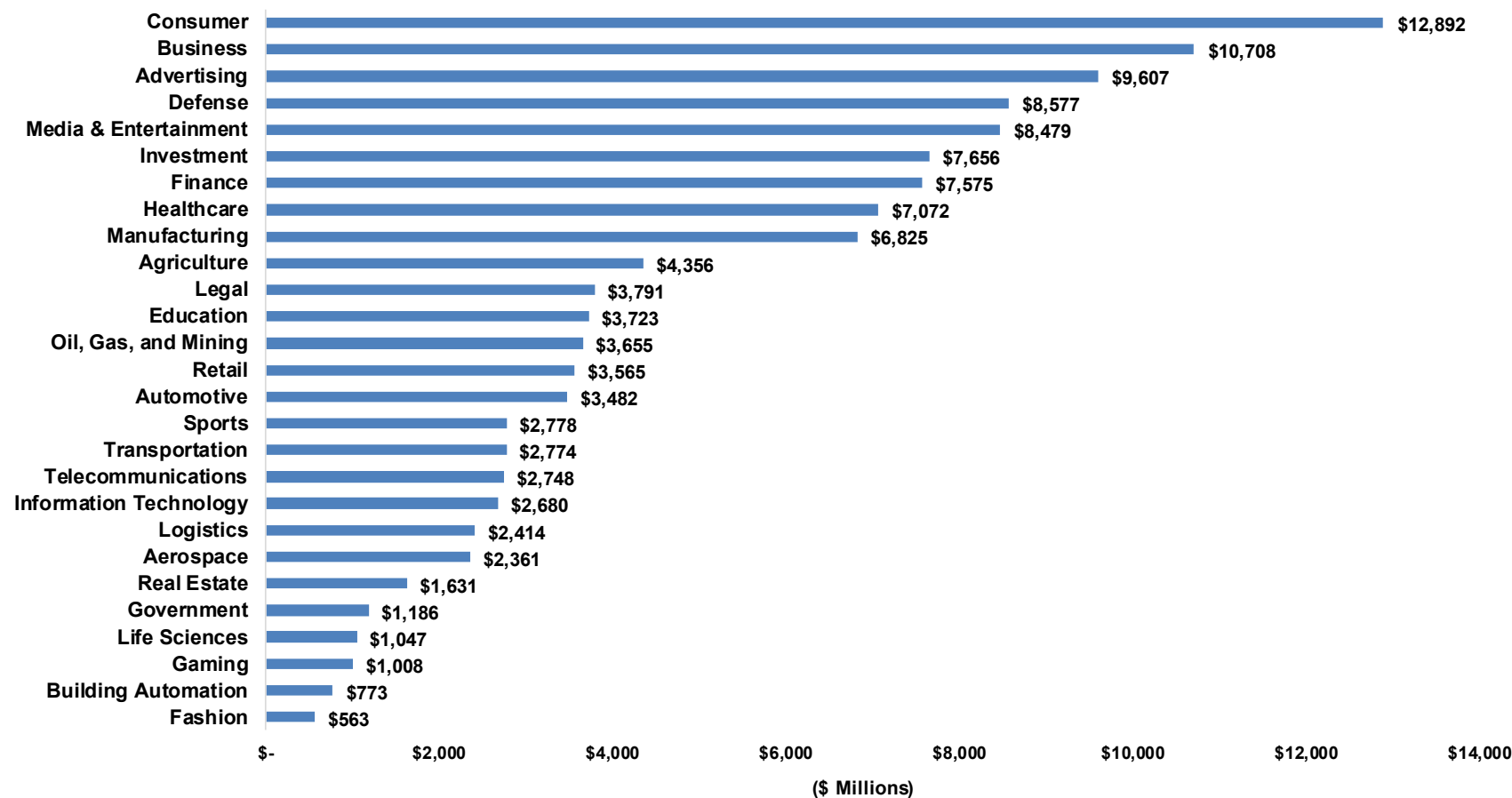
(Source: Tractica)

- By 2025, the market will become increasingly fragmented
- Almost all industries will experience an impact from AI
- Notable industries include business, advertising, consumer, media & entertainment, defense, healthcare, finance, and manufacturing

AI Revenue by Industry



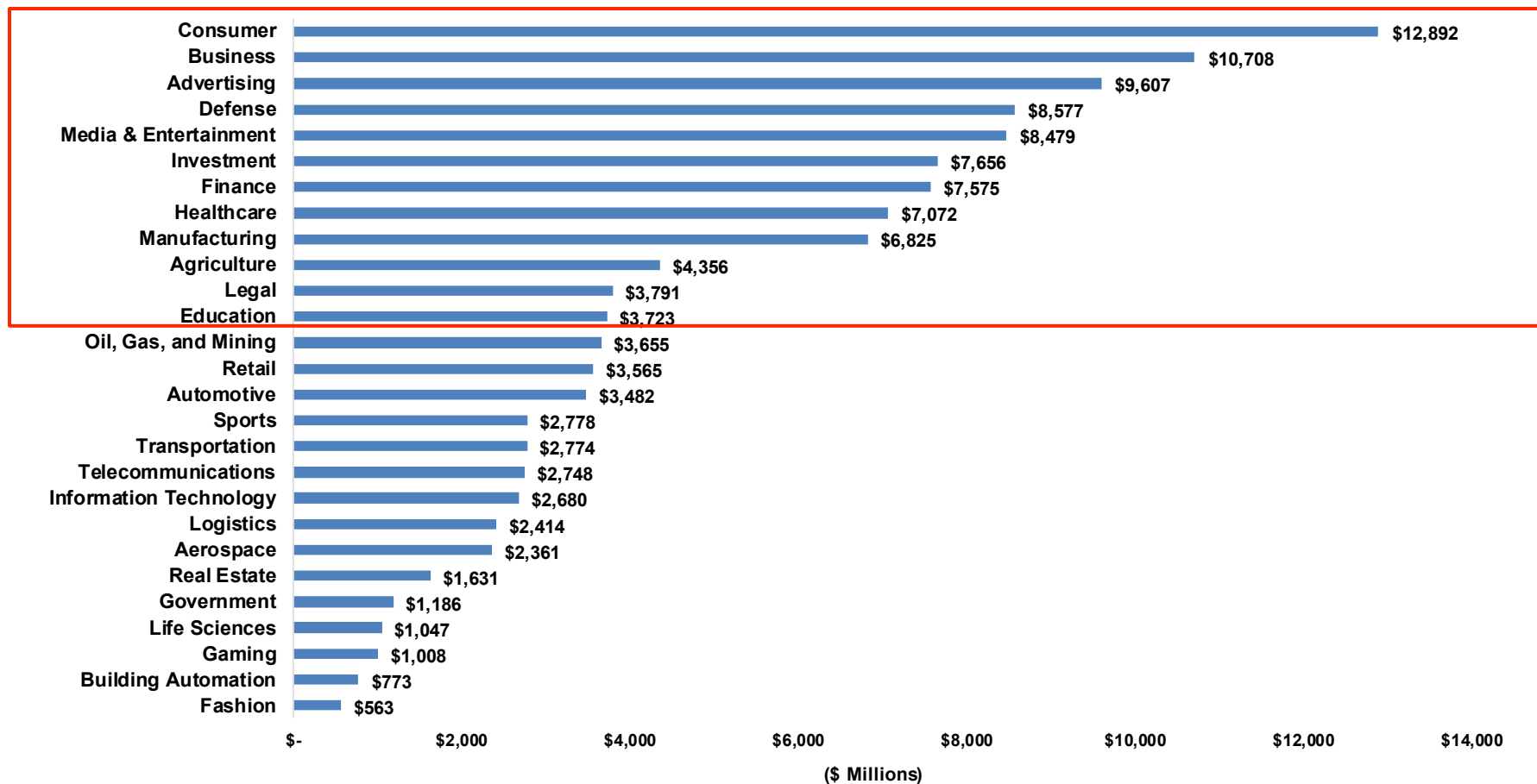
Cumulative Artificial Intelligence Revenue by Industry, World Markets: 2016-2025



(Source: Tractica)

AI Revenue by Industry

Cumulative Artificial Intelligence Revenue by Industry, World Markets: 2016-2025



(Source: Tractica)

Top 12 Industries and Key Use Cases



| | | | |
|--|--|---|--|
| CONSUMER <ul style="list-style-type: none">• Static image recognition, classification, and tagging• Text-based automated bots• Search engine queries• Social media feed curation• Product recommendations | BUSINESS <ul style="list-style-type: none">• Prevention against cybersecurity threats• Chatbot-based e-commerce and sales• Chatbot-based brand/service interaction• Job candidate finder | ADVERTISING <ul style="list-style-type: none">• Static image recognition, classification, and tagging• Text query of images• Video content analysis• Mining audio information from videos and recordings• Real-time ad performance | DEFENSE <ul style="list-style-type: none">• Object identification, detection, classification, tracking from geospatial images• Anomaly detection• Object detection and classification - targeting |
| MEDIA & ENTERTAINMENT <ul style="list-style-type: none">• Content distribution on social media• Human emotion analysis• News curation for consumers• Simulating crowds• Video editing | INVESTMENT <ul style="list-style-type: none">• Algorithmic trading strategy performance improvement• Mechanical broker• Mechanical institutional sales representative | FINANCE <ul style="list-style-type: none">• Efficient, scalable processing of patient data• Risk assessment and compliance• Automated credit scoring• Loan analysis | HEALTHCARE <ul style="list-style-type: none">• 3D computer vision• Efficient, scalable processing of patient data• Medical diagnostic tools - general• Medical assistant for consumers |
| MANUFACTURING <ul style="list-style-type: none">• Object detection and classification - avoidance, navigation• Object identification, localization, and tracking• Predictive maintenance• 3D printing arm control | AGRICULTURE <ul style="list-style-type: none">• Sensor data analysis (IoT)• Crop health analysis• Weather monitoring and analysis• Food safety• Weed identification | LEGAL <ul style="list-style-type: none">• Contract analysis• Legal document review and research | EDUCATION <ul style="list-style-type: none">• Automated Cliffs Notes, study note, and quiz generator• Textual question answering• Personalized education and tutoring |

Categorization of Use Cases



Big Data

- Raw data such as sensors, market indicators, patient data, cybersecurity threats



Vision

- Images or video based applications to recognize objects, people, faces, emotions, etc.



Language

- Understand human text, speech, language

Categorization of Use Cases



Big Data

- Raw data such as sensors, market indicators, patient data, cybersecurity threats



Vision

- Images or video based applications to recognize objects, people, faces, emotions, etc.



Language

- Understand human text, speech, language

Human Perception

Top Use Cases by Category

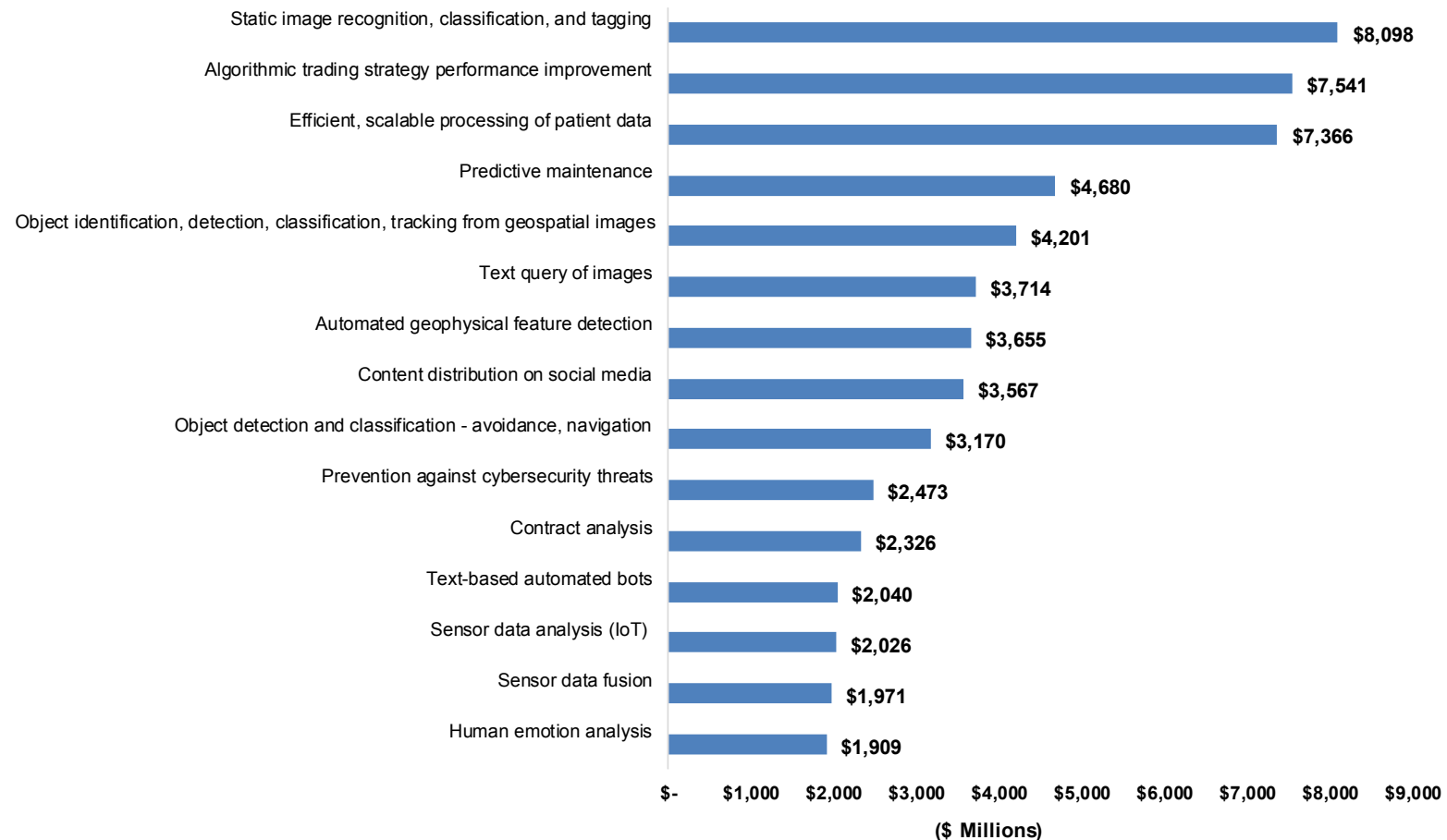


| Use Cases | Big Data | Vision | Language |
|--|----------|--------|----------|
| Static image recognition | | X | |
| Algorithmic trading | X | | |
| Patient data processing | X | | |
| Predictive maintenance | X | | |
| Object identification from geospatial images | | X | |
| Text query of images | | X | X |
| Automated geophysical feature detection | | X | |
| Content distribution on social media | X | | |
| Object detection and classification | | X | |
| Cybersecurity threat prevention | X | | |
| Contract analysis | | | X |
| Text-based automated bots | | | X |
| Sensor data analysis (IoT) | X | | |
| Sensor data fusion | X | | |
| Human emotion analysis | | X | |

Revenue for Top 15 AI Use Cases



Cumulative Artificial Intelligence Revenue, Top 15 Use Cases, World Markets: 2016-2025

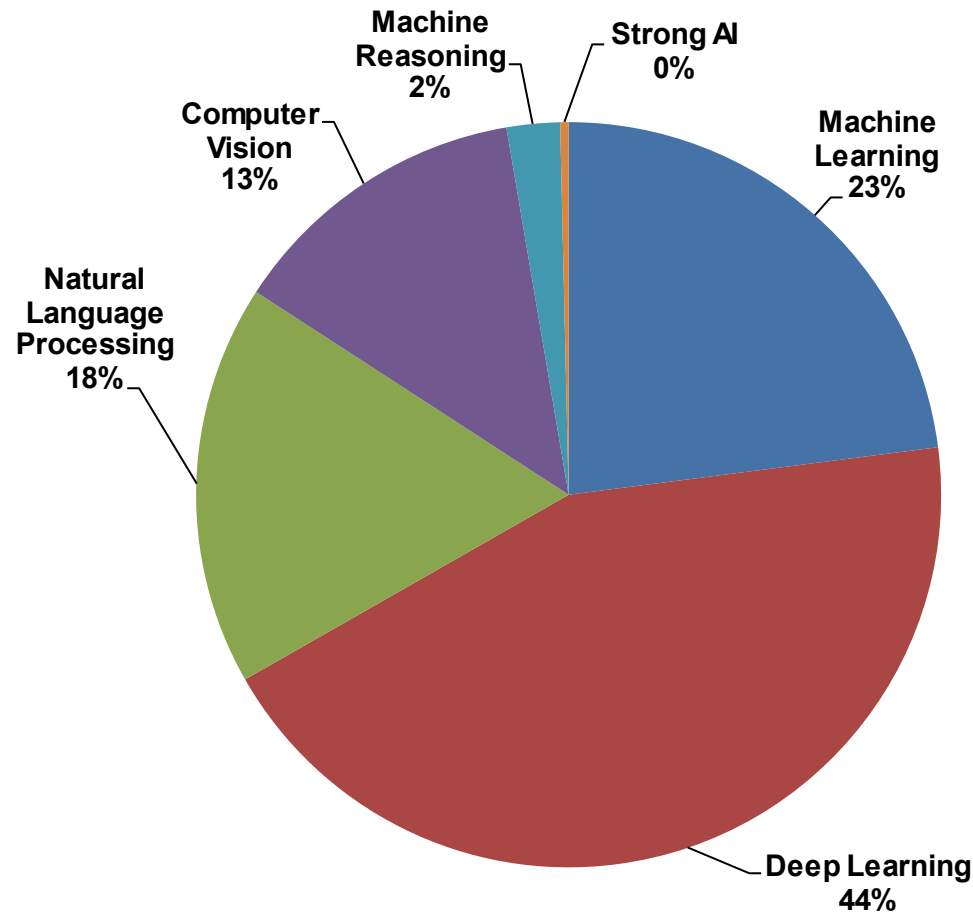


(Source: Tractica)



AI Technology Outlook

AI Revenue by Technology: 2025



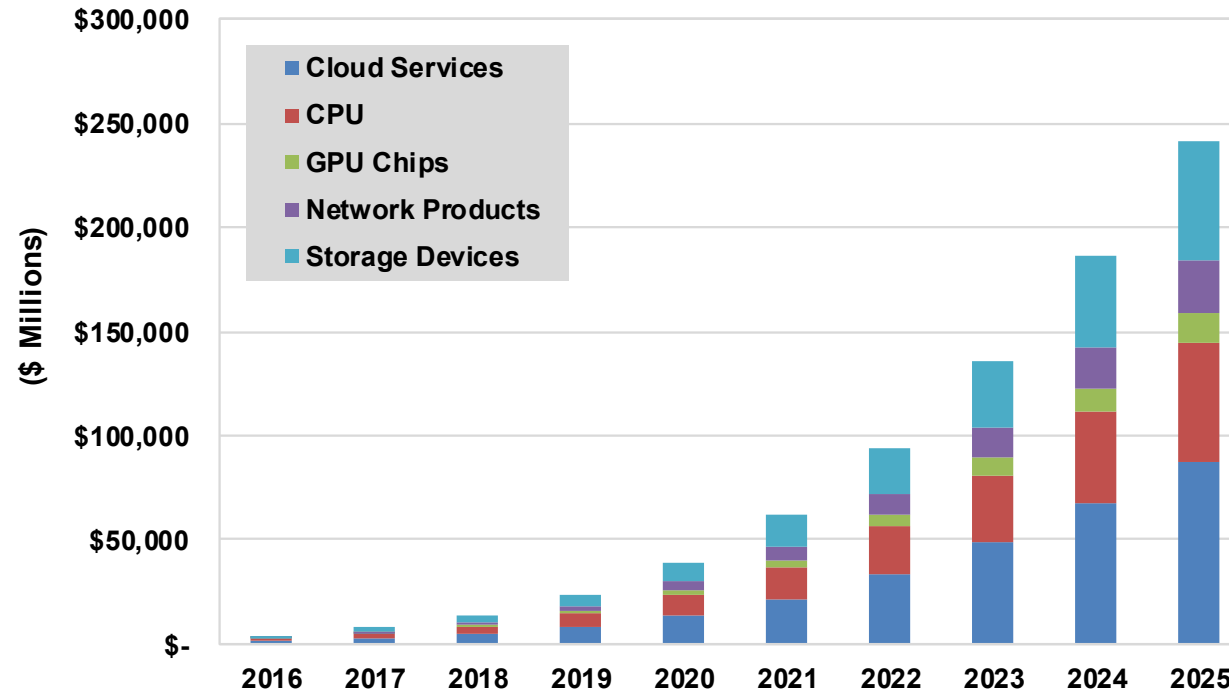
(Source: Tractica)

- Deep learning will be the leading AI technology, accounting for 44% of all AI revenue between 2016 and 2025
- Deep learning is used in combination with ML, NLP, and computer vision, especially when large amount of features need to be extracted
- NLP and computer vision account for 40% of revenue with image and speech-related AI use cases relatively smaller than Big Data use cases



AI-Driven Hardware and Services

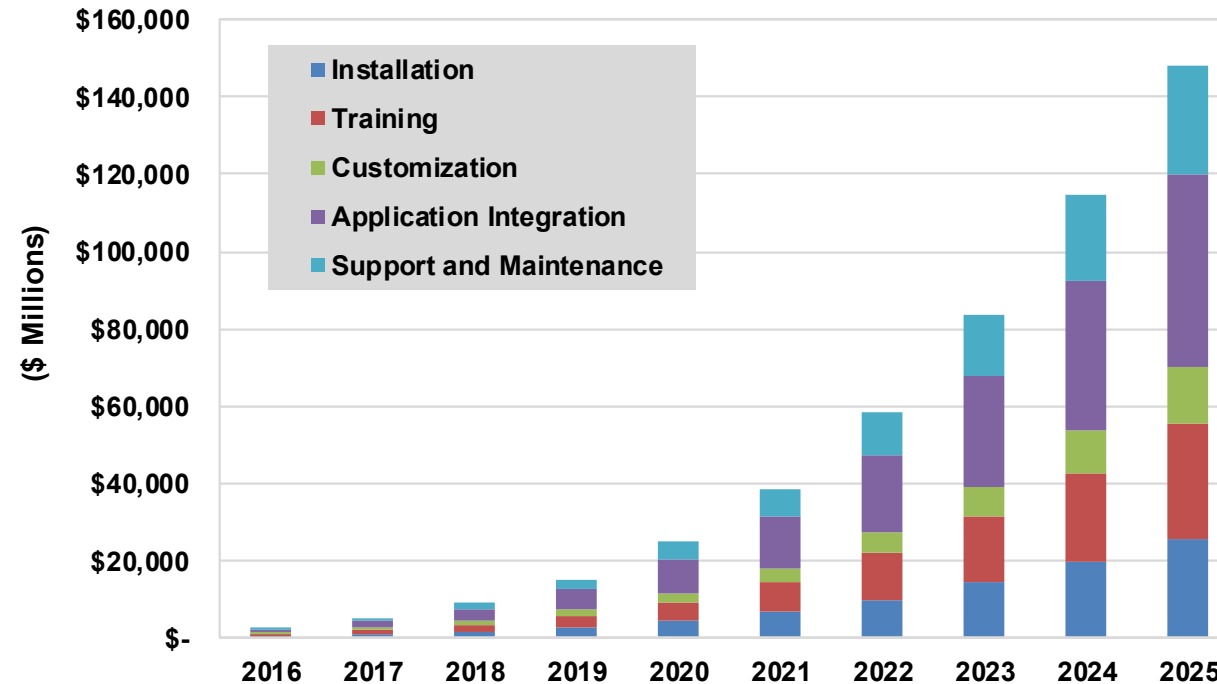
AI-Driven Hardware Revenue by Technology Category, World Markets: 2016-2025



(Source: Tractica)

AI Hardware revenue is approximately a 4x multiple of software revenues. Cloud revenue is considered to be a portion of hardware revenue (~37%). Pure hardware (CPU, GPU, Network, Storage) will grow to be a \$153.8 billion market by 2025.

AI-Driven Services Revenue by Service Category, World Markets: 2016-2025



(Source: Tractica)

AI services revenue is approximately a 4x multiple of software revenues. By 2025, the AI services market will be \$148.3 billion, with application integration constituting the largest share of revenues at ~34%.



Conclusions

- Virtually all AI implementations today are narrow AI, and most strong AI is years in the future.
- AI implementations are driven by three primary factors:
 - Cost reduction
 - Efficiency gains
 - Accuracy improvements
- AI implementations have three primary components:
 - Training data
 - Algorithms
 - Human supervision
- AI is not yet changing fundamental business processes, but in the long run it will have a major disruptive effect on business models and organizational cultures.

- Deep learning is demonstrating the most practical benefits and is the most advanced in terms of commercial acceptance.
- Industries deploy AI on different hardware and software configurations, and there is no single standard platform.
- With commercial acceptance, AI companies are going to require a large supporting business ecosystem including hardware vendors and service providers.
- There is a major risk of AI being oversold – it is not a panacea and is best used for targeted, well-defined applications.
- Once AI works, it is not considered AI anymore.



Q&A

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