AI: Reshaping Manufacturing in India

What Enterprise AI Looks Like, Its Benefits, How to Get Results—and Why You Should Invest Now

- AI Benefits, Market Size, Adoption Rate, Growth Drivers
- AI C-Level Research
- Industry Use Cases
- Expert Commentary
- AI Technology Levers
- Buying Considerations
- Partner Selection Advice

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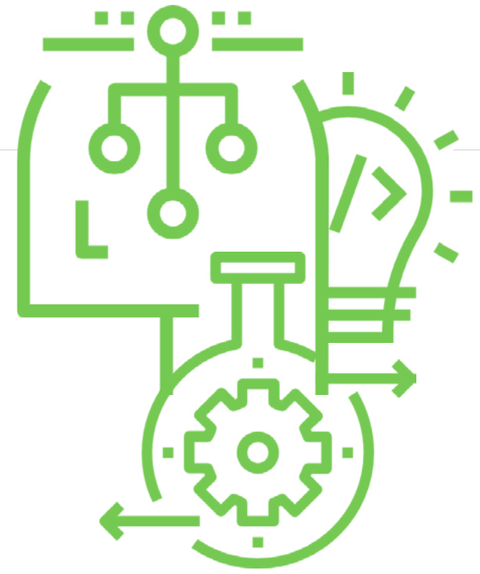

The Acceleration of Artificial Intelligence

AI's time has come. A perfect storm of enterprise interest, data growth, and access to greater compute power, is driving its growth. In this book, we uncover how AI helps specific industries, how the evolution of AI and big data benefits from HPC, and how to select the right AI partner.

64% Of IT and business decision-makers believe their organisations' futures depend on large-scale AI adoption.

Source: Amplifying Human Potential

$1.2 Trillion: The amount businesses adopting AI, IoT and big data will steal from less informed peers by 2020

Source: Forrester

44% Of business executives say that delaying artificial intelligence implementations will make their businesses more vulnerable.

Source: Economist's Intelligence Unit

1.46 The adoption rate of AI in Asia-Pacific on this scale: 1=nascent, 2=exploratory, 3=experimental, 4=applied, 5=deployed.

Source: Economist's Intelligence Unit

AI in FTSE100 & Fortune 500 Companies

Already Implemented AI in Some Form 32%

Planning to in Next 12-18 Months 82%

Source: AI Business Research

$47B Estimated revenues from cognitive systems and artificial intelligence in 2020—from $8 billion in 2016.

Source: IDC

250% ROI from business analytics solutions that incorporate predictive analytics.

Source: IDC

To learn more, please visit www.thinksolution.asia

The AI Revolution

More organisations than ever are turning to artificial intelligence driven by ever-higher levels of customer expectations, heightening pressures from new competition, increased regulation, an incredible growth of structured and unstructured data, and easier access to greater computing power.

Already, about a third of enterprises are exploring AI solutions, and another third are experimenting, according to research from the Economist's Intelligence Unit. And just under 45% of executives say delaying AI implementations would make their businesses vulnerable.

All this interest in AI is driving market growth. According to IDC, "widespread adoption of cognitive systems and artificial intelligence across a broad range of industries will drive worldwide revenues from nearly $8 billion in 2016, to more than $47 billion in 2020...experiencing a compound annual growth rate of 55.1% over the 2016-2020 forecast period."

Where and Why Enterprises Are Investing

AI investment areas, depending on industry, tend to cluster around:

- Machine Learning and Deep Learning
- Predictive and Prescriptive Analytics
- Natural Language Processing
- Computer Vision
- Recommendation Engines.

The benefits of AI to organisations are numerous. At the business level, they include:

- New Levels of Service
- Alternate Sources of Revenue
- Increased Profit
- Business Expansion
- Improved Efficiency and Cost Structures

At the more granular level, AI is expected to turn data into insight and unveil patterns in gigantic data sets more quickly. It's expected to help visualise data, speed up analytics, and drives outcomes faster.

These insights, says a Forrester report titled Predictions 2017: Artificial Intelligence Will Drive The Insights Revolution, will allow early adopters to "steal $1.2 trillion per annum from their less informed peers by 2020."

To learn more, please visit www.thinksolution.asia

Industries That Will Benefit Most From AI

- Healthcare
- Financial Services
- Manufacturing
- Transportation
- Security/Defence
- Oil and Gas
- Marketing/Retail
- Media

76 Of IT and business decision-makers say AI is fundamental to the success of their organisation's strategy

Source: Amplifying Human Potential

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HOW AI BENEFITS MANUFACTURING

Manufactured With AI

1 Enable Predictive Maintenance

With predictive models, manufacturers can enable predictive and preventive maintenance, which shrinks maintenance costs, lowers capital investments in new equipment, and improves profitability.

2 Improve Product Design

AI can help manufacturers scan and analyse millions of images and text, and reams of product data (wear and tear data, service data, etc) to create products that customers want, that are more durable, and that are easier to service.

3 Increase Operational Efficiency

Using predictive data analytics and machine learning, manufacturers can boost production capacity up to 20%, and shrink material consumption by 4%.

4 Fine-Tune Warranties

By modelling use patterns, AI can help manufacturers better define warranties on their products. It can help, for instance, fine-tune the most optimal duration of a warranty.

5 Handle Large-Scale Stock Better

AI's ability to discern patterns and offer advice to stock managers, allows them to boost the number of products they manage. It also ensures greater visibility, lowering stock levels and enabling bulk buying.

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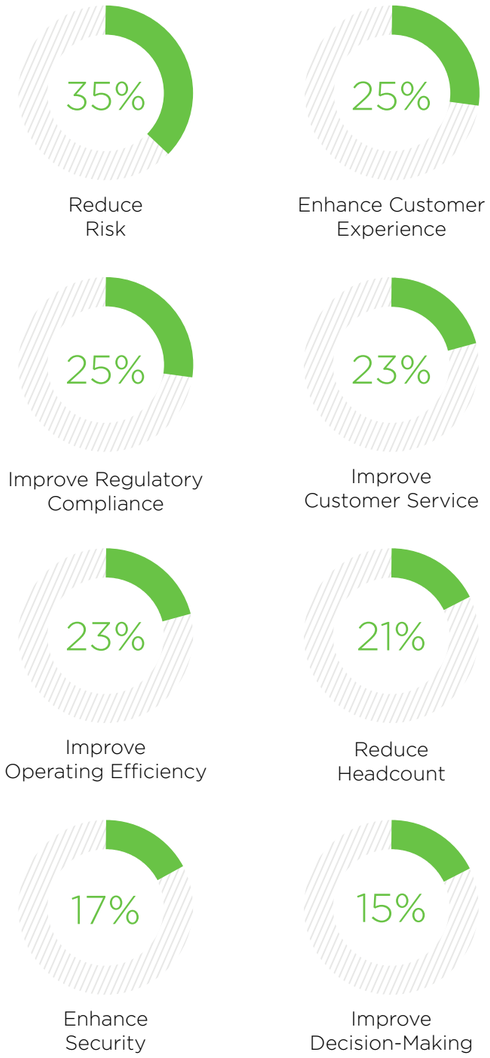
Benefits of AI to Manufacturing



Source: Economist's Intelligence Unit

Top 3 Manufacturing Functions AI Will Impact

- Product development 33%
- Production/assembly 29%
- Inventory management 27%

Source: Economist's Intelligence Unit

"In manufacturing, executives cite improving product quality as a top initiative (of using cognitive systems)."

Jessica Goepfert, Program Director, Customer Insights and Analysis, IDC

3.7/5 The degree with which AI and robotics will affect asian manufacturing competitiveness in 5 years.

Source: MIT's Asia's AI Agenda

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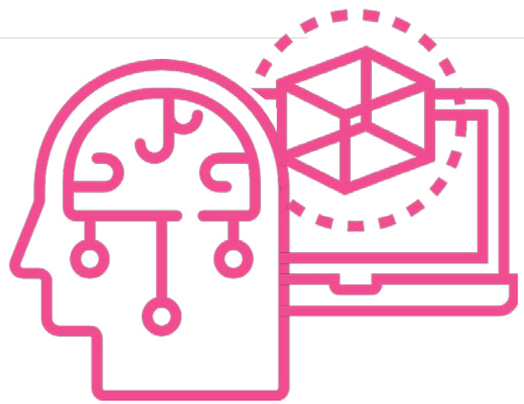
HPDA AND HPC

HPDA: Driving HPC Growth

Big data and high performance data analytics (HPDA) are driving HPC growth. “Big Data is having major impact on HPC and we expect it to be one of the fundamental growth drivers,” says Earl Joseph, VP HPC Program, IDC.



28% Of business and IT executives say HPC technologies allow them to scale computationally to build deep learning algorithms that leverage high volumes of data.

Source: InsideBIGDATA’s Guide to Deep Learning & Artificial Intelligence

26% The growth of servers for advanced analytics, what IDC calls high performance data analytics (HPDA), for commercial use.

Source: IDC

“The evolution of AI and big data now is able to benefit from HPC.”

Jonathan Wu, CTO, Data Center Group, Lenovo Asia Pacific

24% Of business and IT executives say HPC equates to faster machine learning.

Source: InsideBIGDATA’s Guide to Deep Learning & Artificial Intelligence

Andrew Ng, former chief scientist at Baidu, and among the world’s foremost authorities on AI, says HPC enables developers to iterate experiments more quickly, shrinking experiment time from months to days.

10x Increase in data to an AI-based speech recognition tool lowers relative error rates by 40%. HPC enables training model to feed on increasingly large data sets.

25% Of business and IT executives say HPC techniques allow the training of deep neural networks.

Source: InsideBIGDATA’s Guide to Deep Learning & Artificial Intelligence

To learn more, please visit www.thinksolution.asia

Driven by the need to transform businesses and drive break-through ideas, more enterprises are embracing HPC solutions. They are finding surprisingly high levels of return on investment, in terms of time, profit and revenue.

$551

The average amount of revenue from every dollar invested in HPC.

Source: IDC

$52

The amount of profit or cost savings from every dollar invested in HPC.

Source: IDC

1.9 Years

The average time it takes for HPC projects to get ROI.

Source: IDC

HPC Return on Investment By Organisation Size

	Revenue Per Dollar Invested in HPC	Profit Per Dollar Invested in HPC
Small Organisations	$28.3	$17.4
Medium Organisations	$875.1	$62.4
Large Organisations	$738.2	$44.0

Source: IDC HPC ROI Research Update

To learn more, please visit www.thinksolution.asia

"These are tremendous returns...and a big part of this is because HPC is often applied to very successful and big projects and programs."

Earl Joseph, VP HPC Program, IDC

Benefits of HPC-Driven Innovation

- Better Products
- Cost Savings
- Created New Approach
- Discovered Something New
- Helped Society
- Scientific Breakthrough

Source: IDC HPC ROI Research Update

35% How much Lenovo's Direct Water Cool technology lowered power consumption at the Leibniz Supercomputing Centre in Germany—bringing down costs from €27.6 million to €17.4 million.

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WHY CHOOSE LENOVO

For enterprises keen to expand their AI footprint, selecting the right AI partner is crucial. At the heart of this decision lies 8 key criteria, ranging from a provider's TCO and market leadership and from manageability to its innovation quotient.

Low Total Cost of Ownership

Lenovo's warm-water cooling technology lowers total cost of ownership, resulting in superior ROI from HPC deployments.

Innovative Partner

Lenovo's HPC Innovation Centers in Stuttgart and Beijing help maximize HPC ROI. And it is opening three AI Innovation Centers this year.

High Performance

Lenovo's team of performance and application experts, and services professionals help extract the most performance out of your investments.

Increased Manageability

Lenovo intelligent Cluster Orchestrator makes it easy to deploy, launch and manage enterprise-level HPC and AI system and workloads.

To learn more, please visit www.thinksolution.asia

18% Lenovo's high-performance computing market share—the second highest in a field of 10-plus technology providers, according to IDC.

Source: Future of Work

17% The growth of Lenovo's high-performance computing business—making it the fastest-growing HPC provider in the world, according to IDC.

Source: Future of Work

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WHY CHOOSE LENOVO

"One of the ways in which Lenovo stands out is its water-cooled technology. That's a key thing, especially from a TCO perspective."

Jonathan Wu, CTO, Data Center Group, Lenovo Asia Pacific

Improved Metrics

Lenovo's Intelligent Cluster is factory-integrated and tested, which cuts down enterprise deployment time and risk.

Cutting-Edge Expertise

Lenovo has a team of HPC specialists who can work with organizations to drive AI leadership.

Modular Experience

Lenovo's modular approach protects existing enterprise technology investments and lowers capital expenditure.

Market Leader

Lenovo has the second largest share of the HPC market at 18 percent. And it is also the fastest-growing HPC provider in the world (17 percent growth), says IDC.

To learn more, please visit www.thinksolution.asia

"The Lenovo solution we got is excellent. It's got a fantastic cooling profile. It's allowing us to reduce our cooling costs. And it's a scalable system."

Simon Thompson, Infrastructure Architect, University of Birmingham

The University of Birmingham is the UK's fourth-largest university. It's data centre, which was designed in the 1960's, has limited air cooling capacity. Lenovo; the university's Research Computing Team; and its business partner, OCF; co-developed a cooling technology that's expected to cut cooling-energy costs by up to 83 percent and permit substantially denser server configurations. Lenovo's innovative water-cooling system not only increased the data centre's air-cooling capacity dramatically, but enabled more compute when required.

Full video at Lenovo

Lenovo: Helping Solve Some of Humanity's Greatest Challenges

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