Generative Artificial Intelligence (GenAI) Playbook for Enterprises

Introduction to Generative AI (GenAI)

From problem-solving to art creation, AI's evolution is reshaping our world. Discover GenAI's journey.

Transformative and Growth Opportunities with GenAI

Learn how GenAI boosts productivity, personalises customer experiences, cuts costs, and drives innovation to transform your business.

Implementation Approach to GenAI: Buy or Build

Evaluate whether to buy ready-made GenAI solutions for quick implementation or build custom ones for unique business needs.

Buy

Understand GenAI use cases and ready to use solutions to unlock your business's full potential.

Build

Explore Customised GenAI solutions for your unique needs and gain competitive edge for your business.

References

This Playbook is designed to guide enterprises seeking to implement GenAI to transform their business operations and to stay relevant and competitive. It covers the fundamentals of GenAI, practical use cases and factors to consider when implementing GenAI solutions within your organisation. With this playbook, enterprises can gain information on GenAI implementations, unlock the potential of GenAI, drive innovation, and achieve sustainable growth.

An initiative by

INFOCOMM MEDIA DEVELOPMENT AUTHORITY

Key contributors

aws

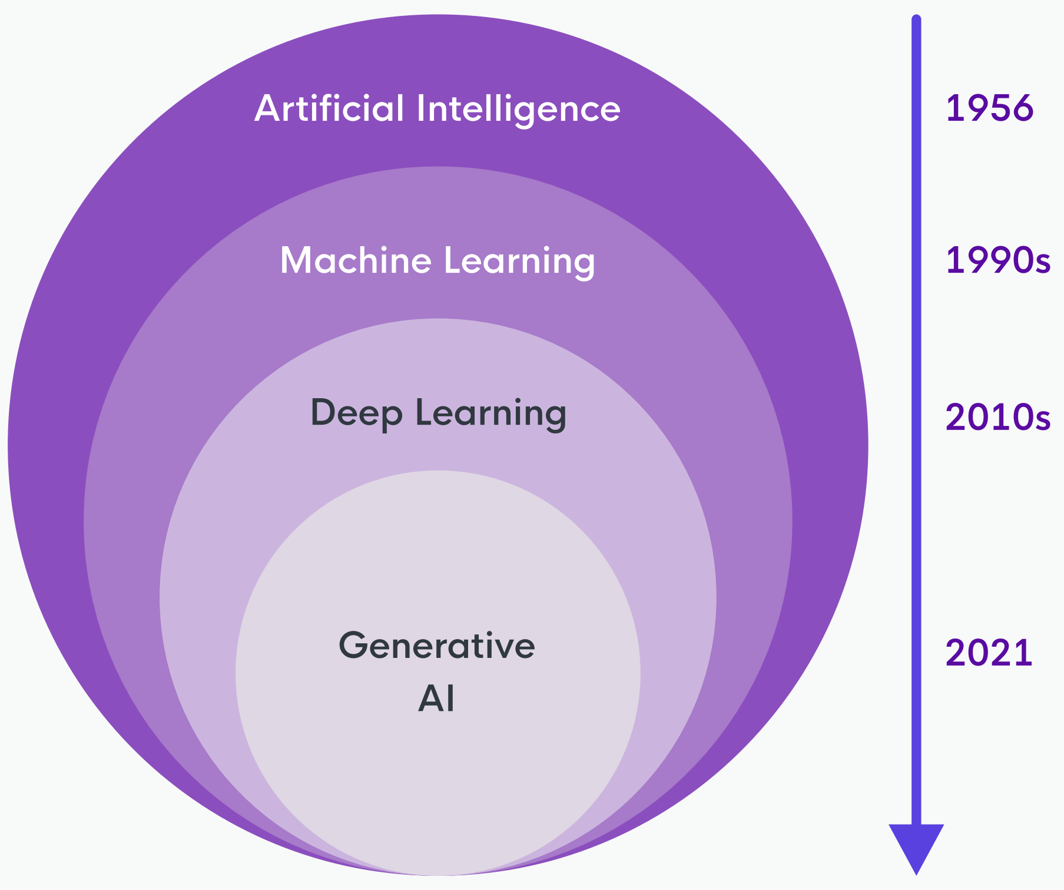
CSA SINGAPORE

Microsoft

NUS National University of Singapore

Introduction to Generative AI (GenAI)

Evolution of AI and GenAI

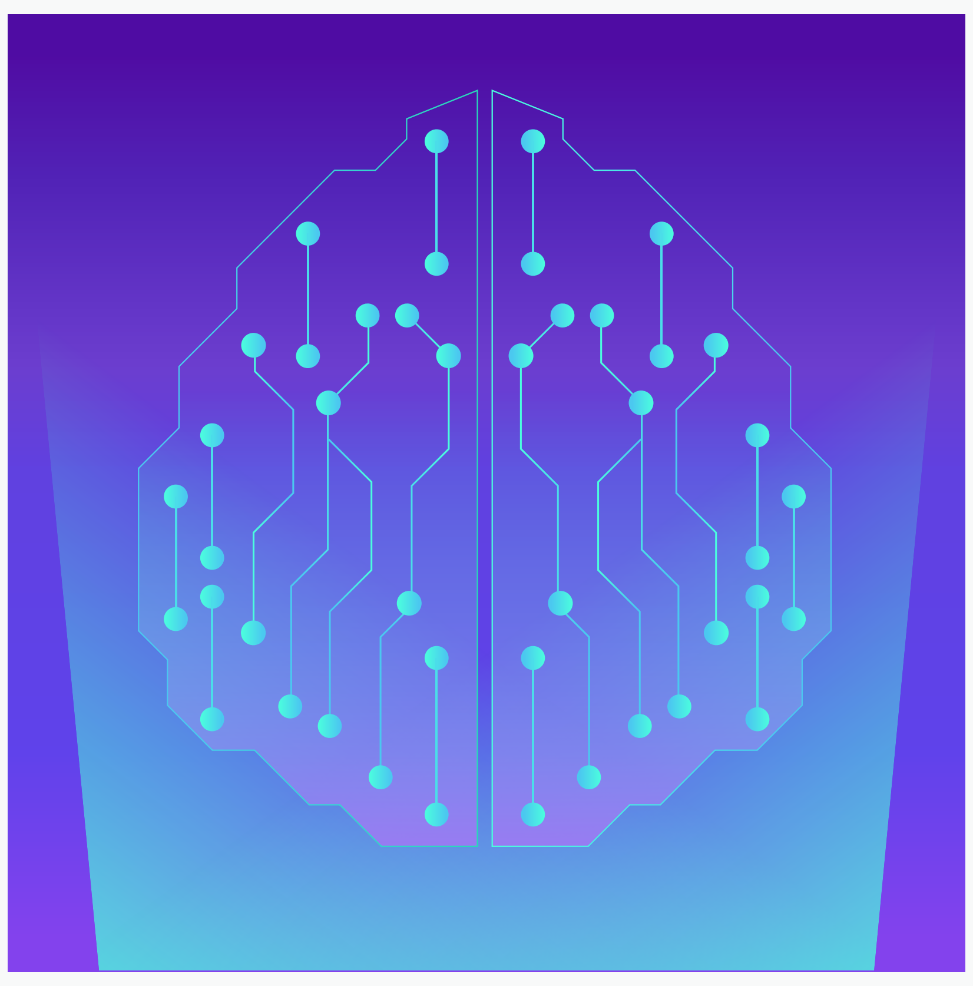


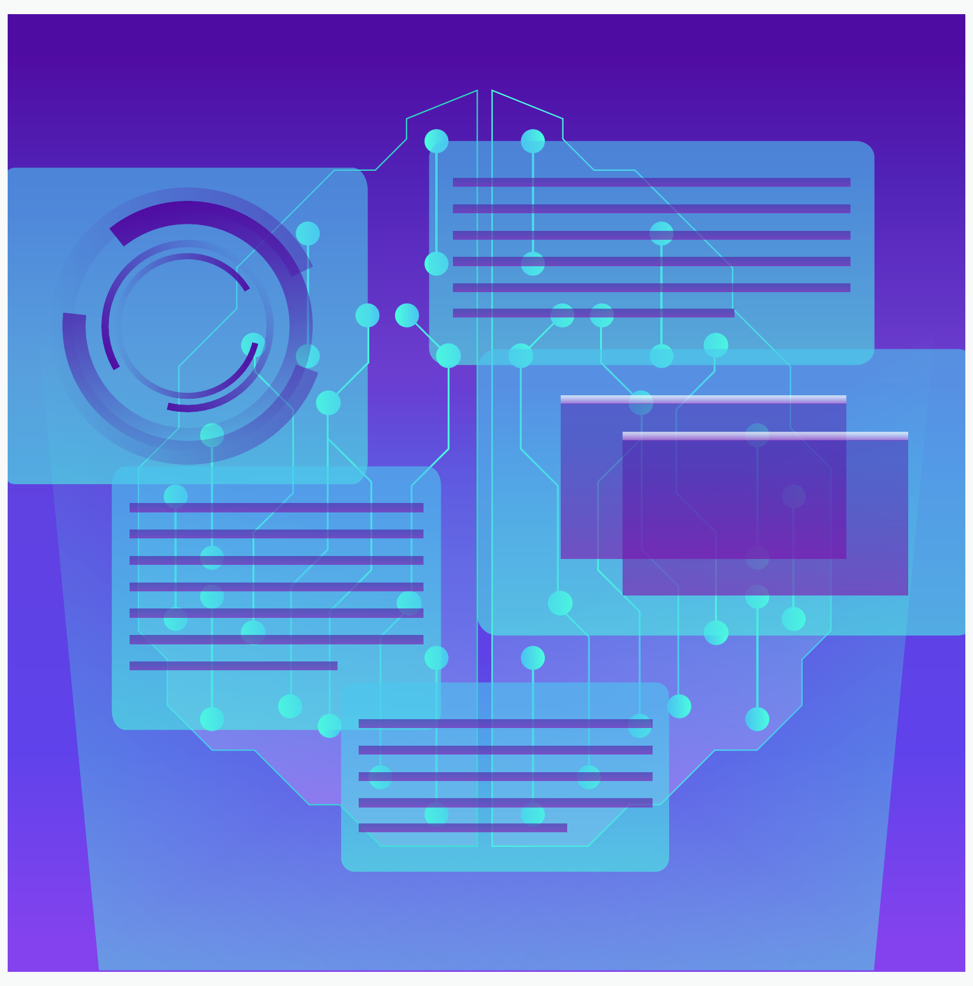
1956	Artificial Intelligence (AI), a new field within computer science, was established with a vision to develop computers capable of achieving human-level intelligence.
1990s	The internet and a surge in data made machine learning possible, allowing computers to learn from data and improve decision-making.
2010s	Scientists created deep learning systems that mimic human brain networks, allowing computers to understand images and speech for the first time.
2021	The emergence of Generative Pre-trained Transformers (GPT) models, capable of generating text, images, and sounds from simple prompts.

Large Language Models (LLMs)

LLMs are a specific type of **GenAI** focused on processing and generating human language. Large Language Models like GPT-4, Llama-3, Amazon Titan, Claude, Gemini are incredibly powerful because they have many parameters, often in the hundreds of billions. These parameters allow the models to learn from vast amounts of data, capturing intricate patterns and nuances in human language, which helps the models to generate coherent and contextually relevant responses. To train and use these models, significant computing power is needed to process substantial amounts of data. This substantial investment in technology results in very advanced models that can create detailed and context-aware responses.

The more data these models are trained on, and the more parameters they have, the better they become at understanding and generating human-like text. With more parameters, the models can learn complex patterns and connections in the data, enabling them to handle complicated tasks like understanding detailed stories, making inferences, and predicting outcomes with limited information. These advanced skills are essential for tasks like analysing legal documents, assisting in medical diagnoses, and forecasting financial trends, where accuracy and understanding the context are crucial.





Retrieval Augmented Generation (RAG)

GenAI models, or large language models (LLMs), excel in many areas but lack inherent knowledge of enterprise-specific workflows and proprietary data. This limitation can hinder their ability to solve organisational problems effectively. To address this, the Retrieval Augmented Generation (RAG) pattern is employed, enhancing LLMs with enterprise-specific information.

RAG combines a Reasoning Engine (the AI that generates responses) with a Retrieval Engine. The latter improves performance by converting various data types into searchable formats using vector search.

Vector search converts data (numbers, text, images, audio, video) into numerical vectors, capturing their essence and context. This enables more efficient similarity searches compared to traditional methods. By implementing RAG, AI can handle enterprise-specific issues more accurately, providing tailored responses that meet the organisation's needs.

Examples on the types of GenAI models

① Text Generation

Models and Examples:
OpenAI's GPT (GPT-3.5, GPT-4, GPT-4V), Meta's Llama, Google's Gemini, Alibaba Cloud Qwen, PCL-BAIDU Wenxin

Applications:
Writing articles, essays, poetry, dialogues; generating code; content creation; customer support; educational applications

② Image Generation

Models and Examples:
DALL-E, Stable Diffusion

Applications:
Graphic design, digital art, advertising, visual storytelling, creative expression

③ Audio Generation

Models and Examples:
OpenAI's GPT-4V real-time model, Alibaba Cloud Qwen-Audio

Applications:
Voice assistants, audiobooks, podcasts, music composition, realistic auditory experiences

④ Video Generation

Models and Examples:
OpenAI's SORA model

Applications:
Video production, marketing, personalised content delivery, high-quality video creation

⑤ Language Translation

Models and Examples:
Google's Translate, OpenAI's GPT models

Applications:
Real-time translation, document translation, localisation

③ Speech Recognition

Models and Examples:
Google's Speech-to-Text, Amazon Transcribe, OpenAI's Whisper

Applications:
Transcription services, voice commands, accessibility tools

④ Text-to-Speech

Models and Examples:
Google's WaveNet, Amazon Polly, OpenAI's TTS

Applications:
Screen readers, audiobook creation, voice assistants

⑤ 3D Model Generation

Models and Examples:
NVIDIA's GET3D, Google's DreamFusion

Applications:
3D asset creation for games, virtual reality, product design

③ Code Generation

Models and Examples:
GitHub Copilot, OpenAI's Codex, Google's AlphaCode

Applications:
Software development, debugging, code optimisation

Note: The above list are examples of the available models and is non-exhaustive.

Transformative and Growth Opportunities with GenAI

In today's competitive business landscape, enterprises need to constantly seek ways to boost productivity and remain competitive. GenAI is revolutionising multiple industries by offering diverse applications that significantly enhance operational efficiency and innovation.

The key benefits of this transformative technology span across these critical areas:

Increase Efficiency	Personalise Customer Experiences	Reduce Costs	Increase Revenue
GenAI automates repetitive tasks, from creating content to handling customer service inquiries and analysing data. This automation frees up valuable employee time, allowing staff to focus on more strategic initiatives that require human input and decision-making skills.	GenAI enables enterprises to offer personalised experiences at scale by analysing customer data and preferences. GenAI can help to customise products, services, and communications. This level of personalisation can significantly boost customer satisfaction and loyalty, giving smaller businesses a competitive edge.	GenAI can help optimise operations by streamlining processes and reducing the need for manual labour in certain areas. This can lead to significant cost savings, allowing enterprises to allocate their resources more effectively.	GenAI can directly contribute to an enterprise's top line through targeted marketing campaigns, personalised product recommendations, and improved customer service. It is also a powerful tool for sparking creativity, helping enterprises innovate and differentiate themselves in crowded markets.

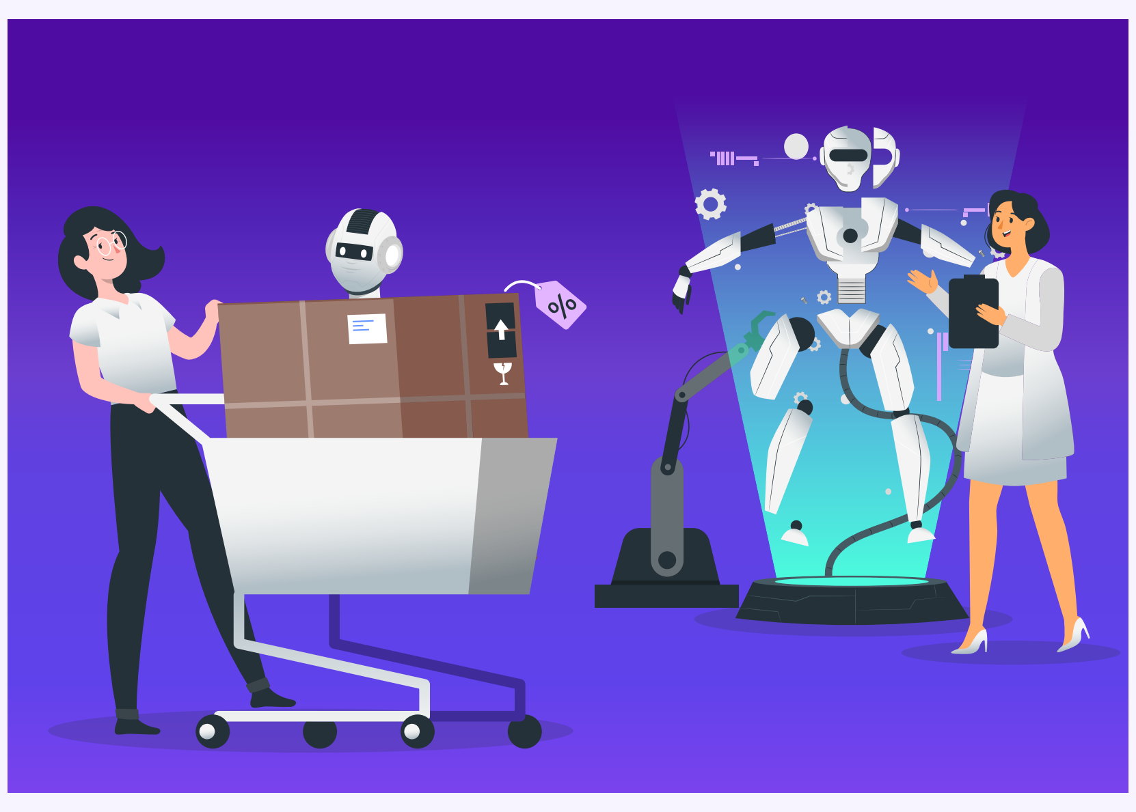
While implementing GenAI requires careful planning and consideration, these benefits make it clear why this technology matters. As GenAI tools become more accessible and user-friendly, they offer a powerful way to compete in an increasingly digital marketplace. By embracing GenAI thoughtfully, enterprises can enhance their operations, innovate more effectively, and punch above their weight in their respective industries.

Implementation Approaches to GenAI: Buy or Build

GenAI has tremendous potential for businesses. However, enterprises adopting GenAI need to decide whether to buy an available GenAI solution or to build their own. Buying allows businesses to quickly leverage GenAI features through existing software, without needing to develop everything from scratch. This option is faster and easier, but it may not provide the level of customisation or competitive edge that building a solution would offer. On the other hand, building a GenAI solution requires more resources, including skilled teams and infrastructure.

For enterprises with less experience in GenAI, buying is an effective way to get started. It helps to lay the necessary foundations and skills that may later benefit the enterprises when they build their own GenAI solutions.

As enterprises are not homogeneous, with varying degrees of digital maturity and business requirements, there are several key considerations when choosing whether to Buy or Build GenAI solutions. These include technical expertise, available resources, customisation needs, time-to-market requirements, long-term strategy, data security and privacy concerns, integration with existing systems, and scalability requirements. The choice depends on the enterprise's specific circumstances and goals.



Cost

When deciding whether to buy an off-the-shelf GenAI solution or to build one, evaluate the total cost of ownership. Building your own GenAI solution can involve high development costs, including expenses for GenAI infrastructure and the recruitment and training of staff with specialised GenAI development experience. There are also ongoing costs related to the maintenance and support of the system.

Cost of Buying or Building a GenAI solution may include:

Buy	Build
• License or subscription fees (e.g. SaaS, licenses) • Integration costs with existing systems (e.g. API calls to services) • Maintenance and support costs (e.g. support subscription for SaaS products)	• Development costs (e.g. developing model, model training) • Infrastructure costs (e.g. hosting, servers, GPU resources for models) • Maintenance and support costs (e.g. enhancements, bug fixes) • Manpower and Training costs (e.g. recruitment and training for GenAI developers)

Example: An enterprise considering building a custom chatbot for customer service might face high upfront costs for GenAI model development and training, while buying a solution with GenAI capabilities might have lower initial costs but ongoing subscription fees.

Guideline

Buying may be preferred if your enterprise is concerned about the upfront cost. Building, while potentially more expensive initially due to development and training costs, could offer long-term cost benefits if the solution will be used extensively.

Meeting Business Requirements

Evaluate the objective of implementing the GenAI solution. If the requirements are for common use cases and there are readily available solutions that can be easily adopted to meet your business needs, buying may be a more practical choice. Building a GenAI solution typically comes at a higher cost, with a longer time-to-market and investment in training and resources. However, this approach can be justified when your business faces unique or complex requirements. In such cases, a tailored GenAI solution may offer a substantial competitive edge, aligned with your needs and potentially setting you apart in the market.

Example: A financial institution might choose to build its own GenAI-powered fraud detection system to gain a competitive edge, while a small e-commerce business might opt to buy an off-the-shelf GenAI-powered recommendation engine.

Guideline

Buying may be preferred if the GenAI solution is widely available, able to meet your business requirements, and can easily interface with your systems and processes. Consider building if the GenAI solution can provide a competitive advantage to your business or if there are complexities in business requirements or processes.

Experience Level

Evaluate the enterprise's level of experience with GenAI. Many enterprises, especially those new to GenAI, may initially lack the confidence or resources to build custom solutions. In such cases, a prudent approach is to start by experimenting with and buying off-the-shelf GenAI solutions. This approach allows enterprises to build internal expertise gradually, assess the impact of GenAI on their processes, and gather valuable insights to make more informed future decisions.

Enterprises may also experiment with market solutions to gain familiarity with GenAI capabilities before deciding whether to proceed with their own development. This approach can help optimise resources while ensuring the solution meets your specific requirements.

Example: A startup looking to implement GenAI-powered sentiment analysis for social media monitoring for the first time might choose to buy an available solution. In contrast, an enterprise with experience and technical knowledge of GenAI might invest time in building its own sentiment analysis model for better long-term control and customisation.

Guideline

Many enterprises, especially those new to GenAI, may initially lack the confidence to build custom solutions. In such cases, enterprises may consider buying available GenAI solutions. This strategy allows your enterprise to gain hands-on experience with the technology, understand its capabilities, and identify more use cases relevant to your business.

Risk and Governance

The responsibilities of owning a GenAI solution encompass many of the same considerations as owning other IT systems, but with additional governance and considerations specific to GenAI technology. There are requirements for updated security patches, adequate security protection, and proper governance and controls. With GenAI technology, there are also risks related to hallucinations, data privacy, etc. Building a GenAI solution can provide the highest level of control over the system, enterprise data and model selection. The enterprise and vendor (if any) will assume responsibility for ongoing software maintenance and patches, security updates and ownership of risks. When buying a GenAI solution, the solution provider may take on these responsibilities for the systems.

As data is used as input to the system and for training purposes, enterprises should bear the responsibility to ensure data quality and governance over data management and privacy for data that is fed to the system.

Example: A healthcare provider handling sensitive patient data might choose to build its own GenAI-powered diagnostic tool to maintain full control over data privacy and model accuracy. Conversely, a retail company might opt to buy a GenAI-powered inventory management system, relying on the vendor's expertise in maintaining and securing the system.

Guideline

Build your own GenAI solution if your enterprise wishes to have greater control over system features, customisation, and upgrading schedules. This approach also allows for tailored risk management and enhanced data protection measures, which are crucial when dealing with sensitive or confidential information.

Customisation

Buying off-the-shelf GenAI solutions may have limitations in terms of customisation and integration with existing enterprise systems. These pre-built solutions often use proprietary models and APIs, which can restrict the ability to fine-tune the model for specific domain knowledge or unique use cases. There may also be limitations in building a seamless user interface with the enterprise's existing systems. Building a GenAI solution allows for significant customisation, control over the user interface, and better alignment with the business's unique workflow and systems.

Example: An enterprise might build a custom GenAI system tailored to specific industry requirements and its own unique workflow. On the other hand, a small business might buy a pre-built GenAI solution for generic business use cases such as the creation of blogs, articles, and summarisation of documents.

Guideline

Buying is preferred if available vendor solutions offer adequate UX and tools for integration with your systems or workflows. Build your own GenAI solution if you require a highly customised context, the ability to change the GenAI models, specific UX requirements, or need seamless deep integration with other internal systems.

Implementation Approach to GenAI: Buy

Practical use cases of GenAI in business operations

Artificial intelligence (AI) has progressed rapidly, placing GenAI in the spotlight of business innovation. While traditional AI relies on a data-driven model to solve problems, GenAI develops new content, ideas, and strategies based on learned patterns across vast datasets. This capability to generate new insights has opened an infinite number of possibilities for business.

Here is a list of examples of non-exhaustive GenAI use cases that are readily available for adoption:

Office Productivity

View solutions

GenAI Document Generation
Create various types of documents, such as reports, emails, and presentations, saving time and effort for employees. For example, a manager can use GenAI to generate a detailed project report based on data from different sources, saving hours of manual work.

Meeting Scheduling and Management
Automate meeting scheduling, send reminders, and generate meeting notes, thereby improving team efficiency and communication. For example, a team can use GenAI to schedule meetings, send meeting invitations, and generate meeting notes based on discussions.

Data Analysis and Reporting
Analyse large datasets to identify trends, patterns, and insights, thereby supporting data-driven decision-making. For example, a business analyst can use GenAI to analyse sales data and identify key trends that can inform marketing strategies.

Marketing and Sales Content Creation

View solutions

Create and improve written content quickly
Generate various types of written content, from short social media posts and product descriptions to long-form articles and blog posts. It can also assist in optimising existing content for search engines (SEO) and improving readability. For example, generating engaging social media captions for a product launch.

Generate visual or audio content affordably
Create various forms of visual and audio content, such as images, animations, videos, and music. For example, generating unique images and illustrations for social media posts and marketing materials.

Personalise marketing materials based on customer profile
Personalise marketing and sales messages based on individual customer profiles and preferences. This allows for more targeted and effective outreach. For example, creating targeted advertisements based on customer demographics, interests, and online behaviour.

Convert sales and marketing content from one format to another
Convert marketing and sales content from one format to another. This can save time and effort while maintaining consistency across different channels. For example, auto generating product descriptions from images of products.

Develop new ideas for marketing campaigns and products
Generate new marketing campaign ideas, test different messaging strategies, and evaluate the potential success of new products or services. For example, brainstorming different marketing campaign concepts and evaluating their potential effectiveness.

Improve your online presence with different marketing approaches
Test different messaging strategies and evaluate the potential success of new products or services. For example, testing different versions of marketing messages to determine which ones perform best.

Understand your target market, customers and competitors in real-time
Gather and analyse market data, identify consumer trends, and track competitor activity. For example, analysing social media trends and identifying emerging consumer preferences.

Create easy to understand marketing reports
Analyse data from various sources, such as customer interactions, market trends, and competitor activities, to generate valuable insights that can inform and enhance marketing and sales campaigns. For example, identify key customer segments and their preferences.

Generative Web Design
Streamline web design by automating tasks and providing creative inspiration. It can quickly generate custom website layouts and designs, explore different design variations, and optimise for user experience. For example, a small business owner can use a generative web design tool to create a professional website in just a few hours, without any coding knowledge.

Customer Engagement

View solutions

Front-end (Direct Customer Interaction):

Lead Generation and Management
Automate collection of information on sales leads, qualify them, and prioritise follow-up actions. For example, a chatbot can engage with website visitors, gather their contact information, and qualify them as potential customers.

Sales Assistance
Guide customers through the sales process by answering questions, providing product recommendations, and addressing concerns. For instance, a virtual sales assistant can help customers compare products, calculate costs, and complete purchases.

Customer Support
Provide customer support before and after sales, including order tracking, product information, and troubleshooting assistance. For example, a chatbot can answer common customer questions about product usage, returns, and shipping.

Scheduling and Reservations
Assist customers in making bookings or reservations based on available resources and past preferences. For example, a virtual assistant can help customers book appointments, reserve hotel rooms, or schedule service appointments.

Back-end (Supporting Customer Service Staff):

Customer Conversation Transcription and Summarisation
Transcribe and summarise customer conversations for staff reference. For example, by transcribing and summarising customer service calls, businesses can identify common customer pain points and improve product features.

AI-Powered Response Suggestions
Suggest replies to customer queries and answer customer service agents' questions. For example, GenAI can suggest pre-written responses to common customer questions, saving agents time and effort.

Empowering Customer Service
Provide agents with access to verified information sources for customer responses, including product information, troubleshooting guides, and best practices. GenAI-powered search tools can help agents quickly find the information they need to resolve customer issues.

Real-time Analytics and Insights
Generate post-call analytics and sentiment analysis to identify trends, measure customer satisfaction, and improve service quality. For example, by analysing customer feedback, businesses can identify areas for improvement and take steps to enhance the customer experience.

Quality Assurance and Monitoring
Detect errors in real-time and enable remote intervention by managers. GenAI-powered tools can analyse customer interactions to identify potential issues and provide coaching and training recommendations.

Human Resources

View solutions

Talent Acquisition
Streamline the recruitment process by automating tasks like job posting, resume screening, and candidate sourcing. For example, a recruiter can use GenAI to screen resumes and identify candidates that match specific job requirements, saving time and effort.

Employee Onboarding
Create personalised onboarding experiences for new hires, improving employee satisfaction and retention. For example, an enterprise can use GenAI to generate personalised welcome messages, onboarding checklists, and training materials for new employees.

Performance Management
Automate tasks like performance reviews, goal setting, and feedback, improving employee engagement and development. For example, a manager can use GenAI to generate personalised performance reviews based on employee data and feedback.

Key considerations when buying a GenAI-enabled solution

Here are some key things to consider when buying and using a GenAI-enabled solution:

Data Availability and Time Commitment

- **Quality In, Quality Out:** Ensure the data you input into the GenAI tool is accurate and relevant. For example, if you are using a GenAI tool for customer service, provide accurate and up-to-date product information and frequently asked questions (FAQs).
- **Time Commitment for Implementation:** Commit time and effort to collaborate with vendors, configure the GenAI solution, and optimise its performance within your specific business context.

Vendor and Tool Selection

- **User-Friendliness:** Choose tools that are easy to use and do not require extensive technical expertise. For example, look for tools with intuitive interfaces, clear documentation, and helpful tutorials.
- **Feature-Rich:** Select tools that offer the specific features you need. For example, if you need a tool to generate creative text formats, look for a tool with strong text generation capabilities.
- **Vendor Support and Reliability:** Evaluate the level of vendor support offered, such as customer support, documentation, and training resources.

Content Quality and Accuracy

- **Fact-Checking:** Verify the accuracy of GenAI-generated content, especially for information. For example, if you are using GenAI to generate a blog post about a scientific topic, cross-reference the information with credible sources.
- **Brand Voice and Tone:** Ensure that GenAI-generated content aligns with your brand's voice and tone. For example, if your brand is known for its humorous tone, ensure that the GenAI-generated content reflects this style.
- **Ethical Considerations:** Avoid using GenAI to generate harmful or misleading content. For example, be careful not to use GenAI to create deepfakes or spread misinformation.

Continuous Monitoring and Improvement

- **Expect Configuration and Refinement:** Configure and refine GenAI solutions to work with existing systems or processes. Successful implementation often requires input from enterprises to customise and optimise solutions over time to fit your specific needs.
- **Regular Evaluation:** Monitor the quality of GenAI-generated content and adjust as needed. For example, if the GenAI-generated content is not meeting your expectations, you may need to adjust the prompts or explore different GenAI tools.
- **Seek Feedback:** Gather feedback from users and stakeholders to improve the quality of GenAI-generated content. For example, you can ask customers to provide feedback on the quality of GenAI-generated product descriptions.

Skills and Training Required on Using GenAI

Many SkillsFuture funded courses are available to help enterprises upskill their teams in these areas. Investing in training will ensure that your business can fully leverage the power of GenAI.

Basic AI Concepts

Understanding the fundamentals of GenAI and how it works is crucial for effectively using these tools.

GenAI Fundamentals

Data Management

Knowing how to collect, clean, manage and protect data is essential for feeding accurate information into GenAI models.

Data Management

Prompt Design

Crafting effective prompts is key to getting the desired output from GenAI tools.

Prompt Design

Understanding the Risks of Using GenAI

While GenAI offers significant benefits, there are several risks that businesses must be aware of. Understanding these risks and implementing mitigation strategies is essential to ensuring safe and effective use of GenAI technologies.

When AI "Makes Things Up" (AI Hallucinations)

Risk

GenAI can sometimes produce answers or information that is plain wrong or misleading—this is called a "hallucination." It often happens when the GenAI does not fully understand a topic or gets a confusing question.

Example

When asked about a new product feature, a GenAI assistant describes a feature that does not exist, potentially misleading your customers.

How to Manage It

- **Check Facts:** Have a way to double-check GenAI outputs, like using fact-checking tools or reviewing the content yourself.
- **Clear Instructions:** Give clear and specific instructions to the GenAI to get better and more accurate results.
- **Use GenAI as a starting point:** Treat GenAI as a tool to assist, not replace, human judgment.

When AI Shows Unfair Bias or Inaccuracies

Risk

GenAI can sometimes pick up unfair ideas from the information it learns from. This can make the GenAI say things that demonstrate biasness, offending people, or could hurt how others see your business.

Example

A GenAI content generator creates marketing copy that uses outdated cultural stereotypes, risking offence to diverse customer groups.

How to Manage It

- **Use Varied Information:** Choose GenAI tools that have learned from many kinds of information and viewpoints.
- **Check for Fairness:** To work in a process to check the outputs and make changes as needed.
- **Set Good Rules:** Create guidelines for using GenAI that match your enterprise's values and make sure everyone uses GenAI in a fair and responsible way.

When We Rely Too Much on GenAI

Risk

If we rely on GenAI too much, we might start to lose our own creative and problem-solving skills. We could end up trusting GenAI too much and miss mistakes it makes.

Example

Customer service representatives become overly dependent on GenAI chatbots and find it difficult to handle complex customer issues that require human empathy.

How to Manage It

- **Keep Humans Involved:** Make sure people are always checking and guiding what the GenAI does.
- **Keep Learning:** Encourage everyone to keep improving their own skills alongside using GenAI.
- **Mix It Up:** Use both GenAI and human knowledge and experience to get the best results.

Following Rules and Being Ethical with GenAI

Risk

Using GenAI brings up some tricky questions about what's right and wrong, and there might be new rules coming. Businesses need to think carefully about things like who's responsible if GenAI makes a mistake, who owns the stuff GenAI creates, and how to use GenAI in a way that's fair and good.

Example

Your GenAI-powered hiring tool seems to favour certain profiles of candidates, raising concerns about fairness in your recruitment process.

How to Manage It

- **Develop and Implement Clear AI Usage Policies:** Create and enforce clear guidelines for using GenAI within your company, addressing data privacy, intellectual property, ethical considerations, and employee responsibilities. These policies should align with your company's values and ethical principles.
- **Stay Informed about Best Practices:** Keep up-to-date on best practices and industry standards for responsible AI use.
- **Regularly Review and Update Policies:** Regularly review and update your AI usage policies to ensure they remain relevant and compliant with evolving regulations and ethical guidelines.

Staying CyberSafe when using GenAI

Here are some CyberSafe tips which using GenAI solutions.

Assets: Your Data

Equip your employees with good data management practices when submitting corporate data into external GenAI tools

- **Why:** Sharing sensitive data with external GenAI tools can pose risks such as data breaches, intellectual property theft, and reputational damage.
- **What to do:** Ensure employees check the data use policy of your corporate data before submitting them into external GenAI tools or services.

Ensure employees are aware of and know how to manage potentially inappropriate output from GenAI tools

- **Why:** Understand GenAI limitations as information may not be factually correct (hallucinations) or not representative (biased).
- **What to do:** Ensure employees know when to exercise human oversight and verify vital information from authoritative sources.

Secure and Protect

Verify the security of your GenAI solutions provider

- **Why:** Organisations can get compromised indirectly when cyber attackers exploit a vulnerability in their solutions provider.
- **What to do:** Check the cybersecurity of the GenAI solutions and provider.

Verify the governance and control processes of your GenAI solution provider

- Understand how the provider keeps their solutions safe
- Make sure they have protection against harmful inputs
- Find out how they test for security problems

Reference: https://www.csa.gov.sg/cyber-essentials, Cyber Security Agency of Singapore.

Success Stories

How GenAI Turned 16-Hour Blog Marathons into 30-Minute Marketing Sprints

Business Challenge

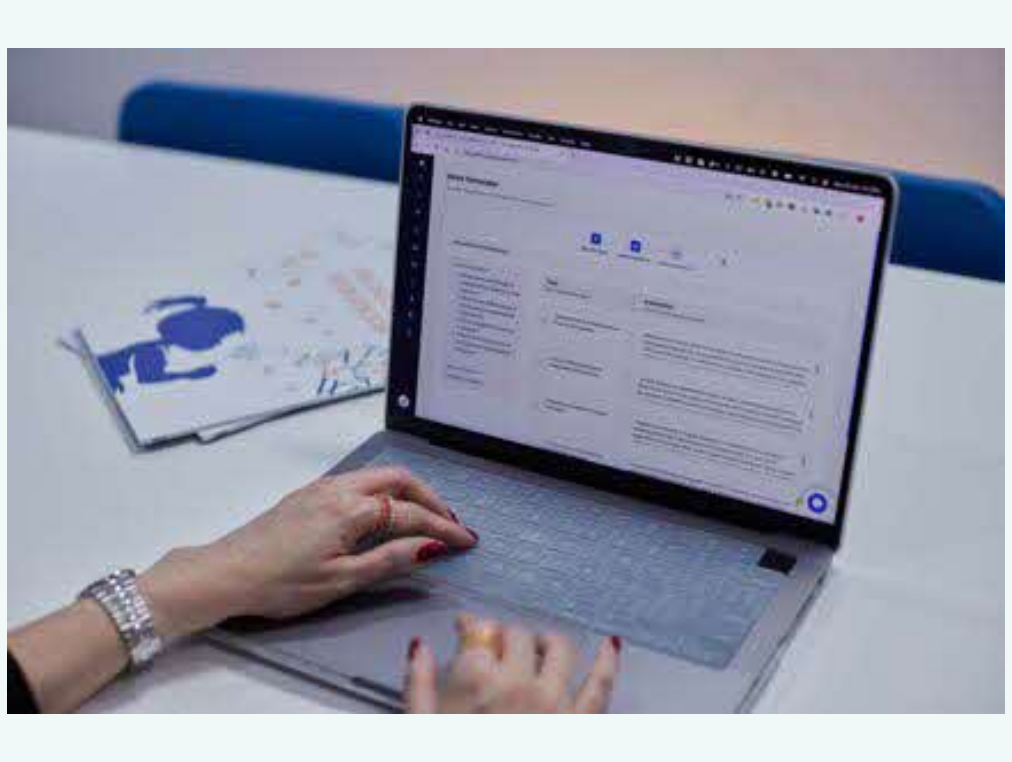
Jan & Elly, a Singapore-based English enrichment centre, faced a common struggle among SMEs: producing consistent, high-quality content for digital marketing. Founder Elly Leong found herself spending up to 18 hours on a single blog post, resulting in sporadic marketing efforts. Like many small businesses, they grappled with topic generation and lacked SEO expertise, hindering their online visibility and growth potential. This challenge resonates with numerous SMEs trying to establish a strong digital presence with limited resources.

Business Impact

By embracing GenAI technology through the IMDA GenAI Sandbox 1.0 initiative, Jan & Elly achieved remarkable results that would inspire any SME. Content creation time plummeted from 18 hours to just 30 minutes per blog post, enabling consistent production of 4 articles and 10 social media posts monthly.

Their SEO performance soared, with a GenAI-generated article reaching Google's first page within 1.5 months. Without having to engage SEO agencies or hire dedicated SEO content marketing specialist, the company saved an estimated $48,000 annually. This allowed them to redirect funds towards business expansion, including new mathematics classes.

The improved online presence led to increased inquiries from potential customers. Additionally, the user-friendly interface of the tool enabled Elly to train two staff members easily, further strengthening the company's content creation capabilities.



Future Plans

Energised by their success, Jan & Elly are now a model for forward-thinking SMEs. Excited about the launch of IMDA GenAI Sandbox 2.0 initiative, they plan to explore more GenAI solutions to further streamline their operations, demonstrating an ongoing commitment to innovation.

As their next step, the company aims to implement a GenAI chatbot on their website to automate customer inquiries. This will not only enhance customer service, but also reduce time spent on routine queries, allowing their team to focus on higher-value interactions.

Their plans to expand business offerings and optimise their use of GenAI tools highlight how technology adoption can drive overall business growth, setting an example for SMEs aiming to thrive in the digital age.

Explore GenAI-enabled Marketing and Sales Content Generation Solutions

How Crestar Fan Boosted Sales and Enhanced Customer Experience with GenAI

Business Challenge

Crestar Fan, a leading innovator in ceiling fan technology, found itself struggling with customer service efficiency and stretched resources. Their team was spending up to 18 hours weekly on repetitive queries, unable to meet the growing demand for instant, round-the-clock support. This challenge, familiar to many small businesses, was holding Crestar back from delivering the exceptional customer experience they aspired to provide.

Business Impact

By embracing GenAI technology through IMDA's Sandbox initiative, Crestar achieved remarkable results that any SME would envy. They slashed time spent on routine tasks by 56%, freeing their team to focus on high-value activities. Sales soared by an impressive 80%, driven by faster response times and improved customer satisfaction.

The chatbot's 24/7 availability and personalised service transformed their customer experience, streamlining processes and reducing the need for in-person support. Perhaps most encouragingly for fellow SMEs, Crestar recouped their investment in just two weeks, proving that GenAI can deliver rapid, tangible benefits even for smaller businesses.

Future Plans

Moving forward, Crestar Fan plans to continue expanding the use of GenAI technologies, as demonstrated by their recent implementation of Microsoft Co-Pilot for streamlining tasks like report and presentation creation. They will focus on training employees to embrace disruption and adapt to technological changes.

The company aims to utilise data-driven insights from AI tools to forecast outcomes and develop strategies for business elevation. They intend to explore further digital adoption opportunities to stay competitive in the rapidly evolving market.

Explore GenAI-enabled Chatbot for Customer Engagement Solutions

Getting Started

To effectively leverage GenAI, enterprises should consider the following steps:

1 Identify Use Cases

Determine specific areas where GenAI can add value to your business operations. Consider tasks like content creation, customer service, HR, or data analysis.

2 Choose the Right Tools

Research and select GenAI tools that align with your specific needs and budget. Consider factors like ease of use, scalability, and integration with existing systems, and data security and privacy. Use the GenAI Navigator to help you identify suitable tools and resources.

3 Build a Strong Foundation

Ensure your team has the necessary technical skills and knowledge to work with GenAI tools. This may involve training employees or hiring GenAI experts.

4 Start Small and Iterate

Begin with small-scale projects to gain experience and build confidence. Gradually expand the use of GenAI as you gain expertise and see positive results. Develop internal guidelines for responsible GenAI use, addressing ethical considerations, data privacy, and intellectual property.

5 Monitor and Evaluate

Monitor the performance of your GenAI solutions and make necessary adjustments. Track key metrics like efficiency, accuracy, customer satisfaction, and compliance with relevant regulations.

By following these steps and addressing the potential risks, enterprises can harness the power of GenAI to drive innovation, improve efficiency, and gain a competitive edge.

Start now with the **GenAI Navigator** to discover potential use cases and tools tailored to your specific business needs, and access related resources such as training and skills.

Explore GenAI Navigator

Implementation Approach to GenAI: Build

Building your own GenAI solution can offer several significant benefits over buying off-the-shelf GenAI solutions. First, it allows for greater flexibility and alignment with your business requirements and workflows, ensuring that the GenAI model is tailored specifically to your objectives, data, and industry needs. This level of customisation can lead to improved performance and more accurate results, as the solution can be fine-tuned to meet your exact specifications.

Building your own solution also enables greater control over data privacy and security, as sensitive information does not need to be shared with third-party vendors.

Ways to build GenAI Solutions: Customise and Adapt vs Bespoke

There are different ways to build GenAI solutions. These include starting from an existing solution and making modifications to meet business requirements (Customise and Adapt) or building entirely from scratch (Bespoke). The differences between each approach are as follows:

1 Customise and Adapt Solutions

Customise and Adapt refers to modifying an existing, off-the-shelf GenAI solution to meet the specific needs of your business. It can involve adjusting parameters, adding domain-specific language models, integrating with your systems, and other modifications.

2 Bespoke Solutions

A bespoke solution involves building a GenAI system from the ground up, designed specifically for your business needs. This means creating new GenAI models, architectures, and workflows based on your unique requirements. The solution is fully tailored to your business use case. Bespoke solutions offer maximum control, flexibility, and scalability but come with a higher investment in terms of time, resources, and expertise.

Practical Use Cases for Building GenAI Solutions

Customise and Adapt solutions are typically needed for:

- **Integration into Business Processes:** The GenAI tool is integrated with the enterprise's existing system, workflow and software e.g. integrating the GenAI tool into the document management workflow.
- **Developing Custom APIs:** Custom APIs are developed to allow seamless data flow between the GenAI tool and other enterprise systems.

Bespoke solutions are typically needed for:

- **Highly Specialised Industry:** When operating in highly specialised fields, like autonomous driving, or aerospace, the GenAI model needs domain-specific knowledge that existing models cannot provide.
- **Complex Business Processes:** If your enterprise has complex business processes, such as workflows or exceptional use cases that cannot be met by off-the-shelf solutions.
- **Competitive Advantage:** When achieving a competitive edge through GenAI innovation is critical for market differentiation, and leads to valuable intellectual property, where competitors cannot easily replicate.
- **Scalability and Integration:** When enterprises require a GenAI solution to seamlessly scale or integrate deeply with their IT infrastructure, bespoke solutions offer the flexibility to build this from scratch.
- **Multi-modal Requirements:** When enterprises require a GenAI solution which can orchestrate across different data objects (e.g. text, audio, video) and data across different business units.

Customise and Adapt	Bespoke
Type of Solution • Less complex and common business use cases • Use of existing LLM models as-is • Using RAG to access enterprise data	**Type of Solution** • More complex business use cases and workflow • Require fine tuning or use of multiple LLMs • Orchestration across different data objects (e.g. text, audio, video) and business units
Example Incorporation of GenAI capabilities into existing customer-facing smart agent application of a hotel to provide GenAI-driven responses and recommendations based on guest's history.	**Example** Develop a weekly planner for an educational institution to automate schedule planning for students; generate feedback on student's progress and provide personalised student learning activities based on structured and unstructured data.
Scope of Project Integrate chatbot with in-house booking system and property management system.	**Scope of Project** Create complex dashboard and orchestrate the generation of plans/content that fit the institution's specific curriculum and pedagogy requirements.
Scale of Project Requires shorter timeline as it involves customising and adapting from existing pre-packaged modules.	**Scale of Project** Requires longer timeline for development from scratch.

Table 1: Customise and Adapt Solutions vs Bespoke Solutions

Key considerations when building GenAI solutions

Here are some of the considerations when building your GenAI solutions from the ground up:

Partners and Technical Capabilities to Build GenAI Solutions

a) Tech Capabilities to Build GenAI Solutions

Enterprises building their own GenAI solutions may decide whether to outsource the development to an external vendor or to set up their own in-house development team to build the GenAI solution.

Outsourcing to a vendor can offer enterprises access to specialised GenAI skills and expertise, without the need to build an entire team internally. Vendors also have access to skilled GenAI engineers and data scientists, with experience in building GenAI solutions for other customers. They can produce high-quality GenAI solutions with proven track records.

Setting up an in-house development team to build the GenAI solution may require significant investment in talent development, training, and cost. Enterprises may consider setting up their own development team if the GenAI solution is part of their core business strategy.

In certain cases, enterprises may also rely on a mix of in-house and outsourced resources to build their GenAI solution. For example, the in-house teams may provide data cleansing, infrastructure setup and integration, while the vendor team can do the heavy lifting around model tuning and model deployment.

Examples of Technical Capabilities required to build GenAI solutions:

- **AI/ML Engineer:** The ability to fine-tune pre-trained models, adjust parameters, and retrain models on specific data to enhance their performance for business needs.
- **Software Engineer:** Integrating GenAI solutions into existing software systems, databases, and APIs to ensure seamless operation across platforms.
- **Data Engineering:** Preparing and cleaning data for training, ensuring high-quality inputs for GenAI models, and building data pipelines for ongoing model updates.
- **Infrastructure or Cloud Engineer:** Experience in setting up infrastructure, managing cloud resources (AWS, Azure, Google Cloud), and ensuring deployment efficiency.
- **Front-end/Back-end Developer:** Knowledge of both front-end and back-end technologies, especially if the solution development involves creating custom web or mobile interfaces.

b) Identifying the Right Technology Partners

Selecting the right technology partners and GenAI vendors is critical for successful GenAI implementation. Enterprises must consider several criteria in this process.

- **Seek Partners with Ability to Build and Provide Technical Support:** Choose partners that have experience in system integration and building GenAI solutions, and can provide comprehensive support services, including training, troubleshooting, and maintenance. Ensure they can adapt to your unique business requirements and are able to provide ongoing technical support and assistance.
- **Evaluate Expertise and Track Record:** Evaluate the vendor's expertise and track record in GenAI solutions relevant to your industry. This includes assessing their technological capabilities and understanding their approach to innovation. As technology evolves, it is challenging to stay on the bleeding edge all the time. Access to technologists with the right skills, who can partner and advise on a wide spectrum of competencies, is key to ensuring AI projects serve business objectives.
- **Verify Data Security and Compliance:** Consider the vendor's commitment to data security and compliance with industry standards, ensuring they align with your organisation's values and requirements.
- **Examine Reputation and Ethics:** Evaluate the partner's reputation in the industry, including their financial stability and commitment to ethical practices. Conduct due diligence to ensure they align with your enterprise's values and long-term objectives.

Governance of GenAI Solutions

It is important for enterprises to consider the governance of their GenAI solutions by implementing comprehensive frameworks and robust safeguards to ensure responsible, ethical and safe development and use of technology.

To ensure proper governance over GenAI implementations, enterprises may adopt model governance frameworks, policies, and guidelines specifically designed for GenAI. Proper governance helps manage the risks associated with GenAI, allowing enterprises to safely harness its power while minimising potential pitfalls.

Enterprises can refer to the **Model Governance Framework for GenAI** by IMDA and AI Verify Foundation to ensure GenAI solutions and stakeholders are safeguarded through responsible and ethical use of GenAI. Learn more

Additionally, the AI Verify Foundation's **Project Moonshot**, a LLM Evaluation Toolkit, is designed to identify LLM deployment risks via benchmarking and red teaming evaluation. It helps developers, compliance teams, and GenAI system owners manage LLM deployment risks by providing a seamless way to evaluate their applications' performance, both pre- and post-deployment. Learn more

Other than adopting a governance framework, enterprises can consider the following GenAI governance-related risks and mitigation measures:

a) Risk of Hallucinations and Ungrounded Content

Hallucinations occur when GenAI generates text that is factually incorrect yet appears convincing or plausible. This phenomenon stems from the fundamental nature of LLMs, which are trained on vast datasets to predict probable sequences of words, rather than to understand or verify information. As a result, these models can produce responses that sound plausible but contain fabricated information. This can lead to misinformation.

Examples of mitigation measures include:

- **Retrieval Augmented Generation (RAG):** RAG enhances the accuracy of responses by incorporating external, verified information into the generation process. This involves retrieving information from curated, reliable sources and integrating this information into the input prompt, thereby grounding the model's responses in factual data. This reduces the likelihood of hallucinations and enhances the factual accuracy and reliability of the generated responses.
- **Human Verification:** Encouraging users to cross-check LLM outputs with reliable sources and implementing human oversight, especially for critical information.
- **Transparent User Interfaces:** Designing user interfaces that clearly label GenAI-generated content, highlight limitations, and provide guidance on responsible usage.
- **User Education:** Providing comprehensive training to users on LLM capabilities, limitations, and the importance of independent verification. Identifying the risks and communicating them to users, including the potential for hallucinations.

b) Risk of Copyright Infringement and Protected Material Regeneration

As GenAI models can learn from large public datasets by scraping the web for data. Accidental use of protected and copyrighted materials can result in legal issues such as lawsuits and fines.

Enterprises must implement safeguards to ensure GenAI generated content complies with intellectual property laws.

Examples of mitigation measures include:

- Implementing content filtering systems to screen generated outputs for potential copyright infringement.
- Establishing clear policies on the use of copyrighted materials.
- Providing employee training on copyright laws and their application to GenAI generated content.
- Implementing a review process for GenAI generated content for commercial use.
- Staying informed about evolving legal landscapes and copyright.

c) Risk to Data Protection and Privacy

A GenAI system may have access to internal datasets to ground the model's responses with enterprise-specific data. If this data is fed to public commercial LLM applications, it could lead to the inadvertent exposure of sensitive information, resulting in potential data leaks.

For instance, employees might unintentionally leak sensitive information by pasting confidential and copyrighted information into public commercial LLM applications. These applications may use user prompts to further train their models unless users explicitly opt out, potentially exposing this information.

Examples of mitigation measures include:

- Developing clear guidelines on what types of data can be shared with external GenAI applications.
- Establishing approval processes for using internal datasets in GenAI systems.
- Monitoring and controlling data flow, e.g., implementing Data Loss Prevention (DLP) tools to detect and prevent unauthorised data sharing.
- Educating employees on the risks of sharing sensitive information with external GenAI tools.

When personal data is used, enterprises should ensure compliance with the **Personal Data Protection Act (PDPA)**. Learn more

Enterprises can also refer to other guidelines and resources on the handling of personal data via the **Personal Data Protection Commission (PDPC)** website. Learn more

d) Risk of Poor Input Data Quality Affecting Output

Low-quality or biased data fed to the system can significantly impact the GenAI output, leading to unreliable or unfair responses. The type of data fed to the GenAI solution can significantly impact the quality of the output. There is a need to ensure data quality and put in place good governance practices throughout the data lifecycle.

Examples of mitigation measures include:

- Establishing robust data quality assurance processes.
- Implementing comprehensive data governance practices throughout the data lifecycle.
- Regularly auditing and updating data sources and processing methods.

Security of GenAI Solutions

When developing a GenAI solution, specific security risks arise throughout the development lifecycle, from data collection to deployment and maintenance. Developing GenAI solutions presents unique security challenges, including potential data poisoning, model inversion attacks, prompt injection, and the risk of generating harmful or biased content.

It is important for enterprises to prioritise the security of their GenAI solutions by implementing robust safeguards, comprehensive protection measures, and continuous monitoring to protect against both traditional cybersecurity threats and GenAI-specific vulnerabilities.

Enterprises can refer to the **Guidelines on Security AI Systems by Cyber Security Agency of Singapore** to secure their GenAI solutions. Learn more

Below are some other related security risks and corresponding mitigation strategies to consider:

a) Risk of Jailbreaks and Prompt-Based Injection Attacks

GenAI is vulnerable to prompt-based injection attacks, where bad actors manipulate input prompts to produce unintended or harmful outputs. This vulnerability poses risks as compromised systems may generate offensive, dangerous or confidential content. Enterprises must implement robust security measures to defend against such attacks.

One method to mitigate such attacks involves constraining the model's behaviour through carefully crafted system prompts. This approach includes providing specific instructions about the model's role, capabilities, and limitations within the system prompt and enforcing strict context adherence by limiting responses to specific tasks or topics and instructing the model to ignore attempts to modify core instructions.

Enterprises may consider the following best practices when designing system prompts:

- Use clear delimiters to separate various parts of the prompt, such as instructions, context, and user input. For example, use triple quotes, XML-style tags, or special characters as delimiters.
- Clearly state where the system instructions end, and user input begins. Instruct the model to ignore any commands or instructions within the user's input that conflict with the system prompt.
- Assign a specific role to the model at the beginning of the prompt to establish behavioural constraints.

b) Risk of Data Breaches

GenAI solutions are susceptible to data breaches and unauthorised access of personal and confidential data. This can lead to breaches of privacy, exposure of sensitive information, and potential legal and reputational consequences.

Enterprises may consider the following best practices to secure their systems:

- Implement robust authentication, e.g. use multi-factor authentication for accessing GenAI systems.
- Regularly update and enforce strong password policies.
- Implement encryption of data e.g. Encrypt data both at rest and in transit.
- Implement real-time monitoring systems to detect unusual access patterns or potential breaches.
- Conduct regular security assessments.
- Perform penetration testing and vulnerability assessments.

By implementing strong security measures, enterprises can reduce the risk of data breaches and unauthorised access, ensuring the safe deployment of GenAI solutions.

c) Risk on Using External Libraries and Tools

GenAI systems developed may include third-party tools and libraries. These external dependencies may also potentially introduce vulnerabilities, bugs, or malicious code. This could affect the security, integrity, and performance of the GenAI system. A weak link can lead to serious exploitation of system flaws. Malicious actors could also target the third-party resources inserting vulnerabilities into the GenAI system.

Enterprises may consider the following best practices to secure their systems:

- Keep all external libraries and tools updated with security patches.
- Implement secure coding practices and continuously monitor for vulnerabilities.
- Avoid using libraries and tools from unknown or untrusted sources.

Leadership Support for Sustainable GenAI Implementations

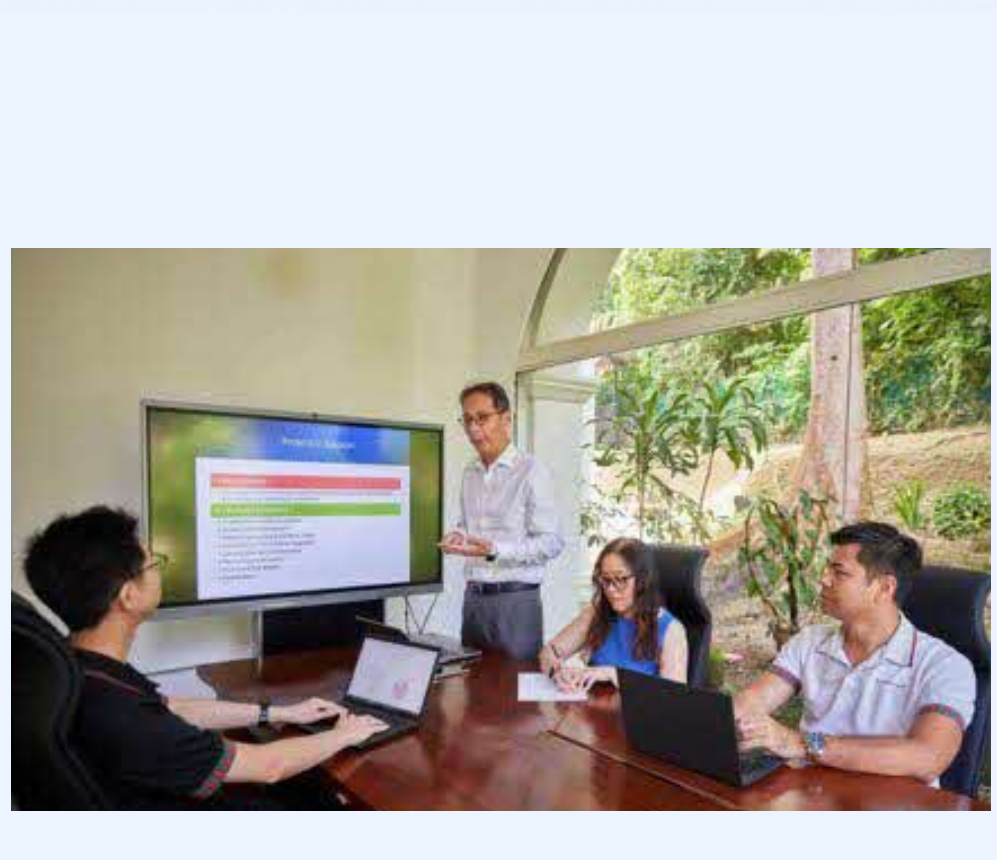
It is important to acknowledge that successful and sustained GenAI implementation goes beyond technology. Technology is but an enabler and enterprises must recognise that other areas such as culture and process, employees and operations should be taken into consideration to enable successful deployment, and overall digital transformation. For example, management must lead with a clear digital vision, setting clear goals and expectations. They should be clear about how technology could impact the business and be committed to providing the necessary support and resources for implementation.

Employees must be engaged and empowered to foster a strong sense of responsibility and ownership towards the project and change process. Management can roll out pilots or trials for employees to gain firsthand experience and familiarity with GenAI. This will help them to understand the benefits of GenAI and motivate them to adopt it more readily. It is also ideal to establish a dedicated digital tech team to drive the transformation process and help cultivate a culture of innovation and continuous learning across all employees.

For more insights into the key focus areas of executing and sustaining digital transformation in general, please refer to **IMDA's Digital Leaders Playbook**. Learn more

Success Stories

Embracing GenAI to Empower Educators



Business Challenges

Founded in 1994, EtonHouse has grown into a global education provider operating 120 schools and serving more than 12,000 children worldwide. Since 2021, the institution has modernised its IT infrastructure, implemented a new student information system and developed in-house data management solutions with predictive dashboards to enhance operations and parent engagement.

Despite these technological advancements, like many educational institutions, EtonHouse faces challenges where educators are overwhelmed with administrative tasks such as curriculum planning, student progress tracking, and parent communications, often requiring extra working hours and contributing to high turnover rates. To address these challenges and enable teachers to focus more on personalised student development, Etonhouse is leveraging GenAI to address these challenges.

Implementation Approach

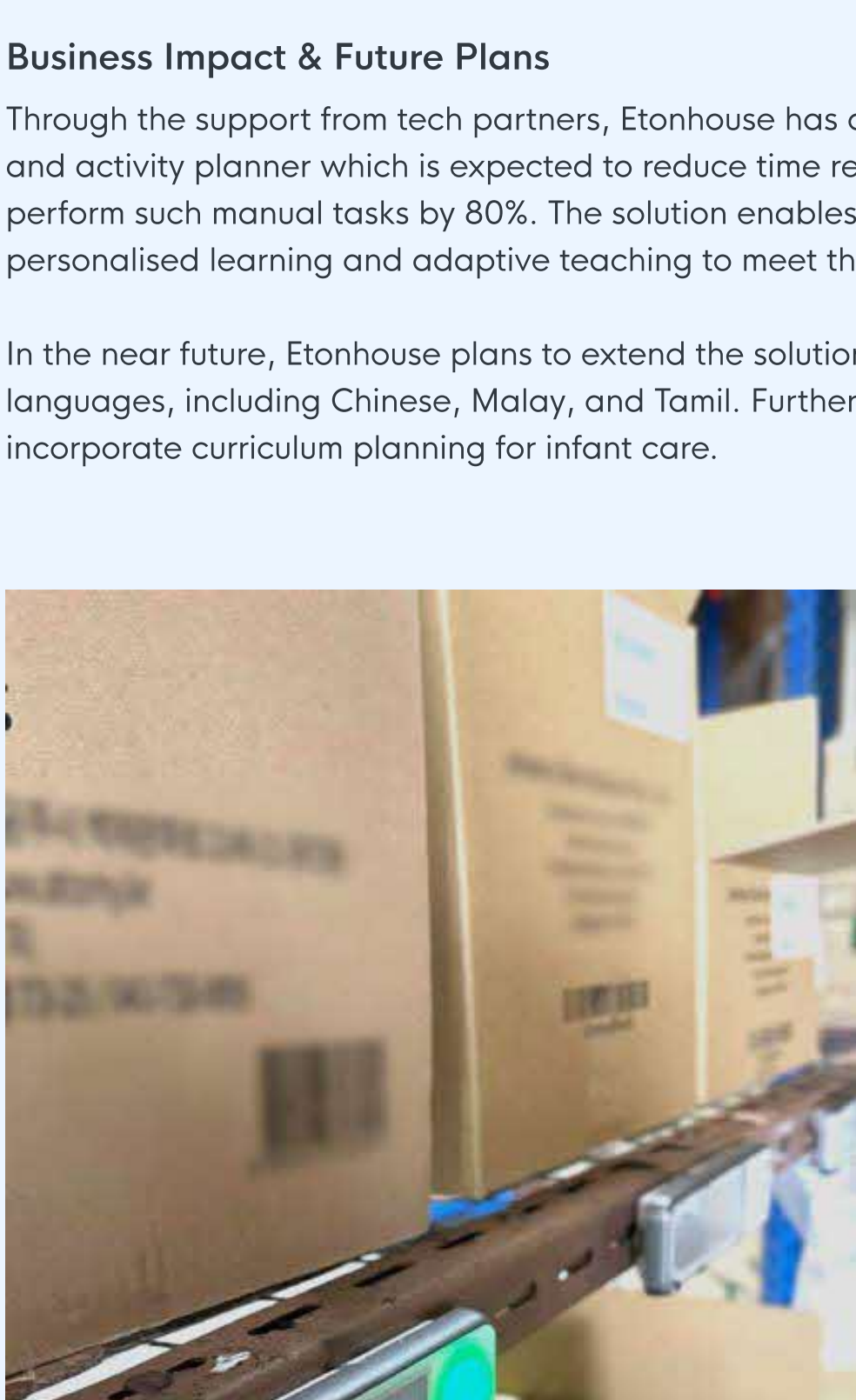
While Etonhouse have explored off-the-shelf solutions, there is still a need to build an GenAI solution to meet their business requirement and alignment to its workflow, such as generating activities ideas that are aligned with its pedagogy frameworks and factor students' learning progress.

The teachers and developer team would also need to be trained to use the GenAI tools efficiently and responsibly. Etonhouse recognised the importance to work with a credible and experienced tech partner to help in the development and ensure successful implementation of the solution.

Business Impact & Future Plans

Through the support from tech partners, Etonhouse has developed a GenAI curriculum and activity planner which is expected to reduce time required by educators to perform such manual tasks by 80%. The solution enables Etonhouse to provide personalised learning and adaptive teaching to meet the students' needs.

In the near future, Etonhouse plans to extend the solution to encompass additional languages, including Chinese, Malay, and Tamil. Furthermore, the expansion will also incorporate curriculum planning for infant care.



Provide unparalleled insights from masses of data, bringing the possibilities of GenAI to our customers

Business Challenges

Today, iHub, a Singapore-based third-party logistics company who operates across five countries and provides a wide range of services such as e-commerce fulfilment, face challenges dealing with the high volume of ad-hoc report requests and non-standard data related queries from their partners daily. However, generating these reports is a time-consuming process often taking hours to generate due to the need for manual data extraction and manipulation across multiple data sources within the web portal.

iHub recognised this as an opportunity where GenAI can aid in data accessibility and reducing query turnaround time. By providing a more intuitive user interaction and interface to ask questions about their data using natural language, GenAI can streamline the report generation process and enhance data analysis. This can help iHub to deliver greater value to users through features like chart integration and generation of insightful summaries directly from the data.

Implementation Approach

Given the complex nature of supply chain logistics, off-the-shelf solutions are often inadequate. There is also a need for higher level of governance over their data and software and overcome the challenges of deploying a nascent technology like GenAI.

Hence, iHub has decided to build its own GenAI solution by its in-house expertise in machine learning and software development and a tech vendor with GenAI expertise. The tech vendor will be able to help the in-house team to build their capabilities in deploying GenAI and provide tech advisory and guidance such as applying best practices in data governance and security.

Business Impact & Future Plans

The implementation of this solution is expected to reduce the time required to generate reports by 50%, creating significant cost savings. The solution is also expected to significantly improve user experience by implementing a multi-turn conversational interface for data extraction. Automated chart generation will also be integrated.

iHub will also be able to provide customers with a higher level of service, empowering customers to gain deeper real-time insights into their supply chain, such as identifying slow-moving inventory or order patterns, allowing more effective strategic planning and business growth.

This new value-added solution, coupled with the comprehensive suite of in-house developed applications, have enabled the iHub to acquire new customers. Existing customers have also expressed excitement in the solution, which suggests the potential for more revenue streams.

Getting Started

To get started in building GenAI solutions, enterprises must consider the following steps:

1. **Gain understanding** of GenAI technology, its capabilities and limitations, potential risks, governance, security, and responsible usage.
2. **Identify use cases** where GenAI can bring the most value and realise the return on investment (ROI) in terms of time savings, increased revenue, and access to new markets and opportunities.
3. **Access to expertise and resources** to scope, build and implement GenAI solutions, regardless of whether they are built in-house or with vendors.
4. **Gain support from management and employees** for successful and sustainable GenAI implementation.

The GenAI for Digital Leaders (GenAI x DL) initiative, launched in March 2024, is designed to help enterprises raise their understanding of GenAI and provide access to tech discovery workshops, 1-to-1 project scoping with GenAI expertise, and support to build GenAI solutions with tech vendors.

Sign up for the GenAI x Digital Leaders initiative and gain access to the available resources to support you on your journey in building your own GenAI solution. Join the GenAI x Digital Leaders initiative

References

AI Verify: Project Moonshot

AI Verify: Model AI Governance Framework for GenAI (MGF for GenAI)

CTOaaS – GenAI Navigator

Cyber Essentials by Cyber Security Agency of Singapore

Cyber Trust by Cyber Security Agency of Singapore

Digital Leaders Playbook

GenAI x Digital Leaders initiative

Generative AI Sandbox

Generative AI: Implications For Trust and Governance

Guidelines on Security AI Systems by Cyber Security Agency of Singapore to secure their GenAI solutions

Personal Data Protection Act (PDPA)

SkillsFuture Singapore