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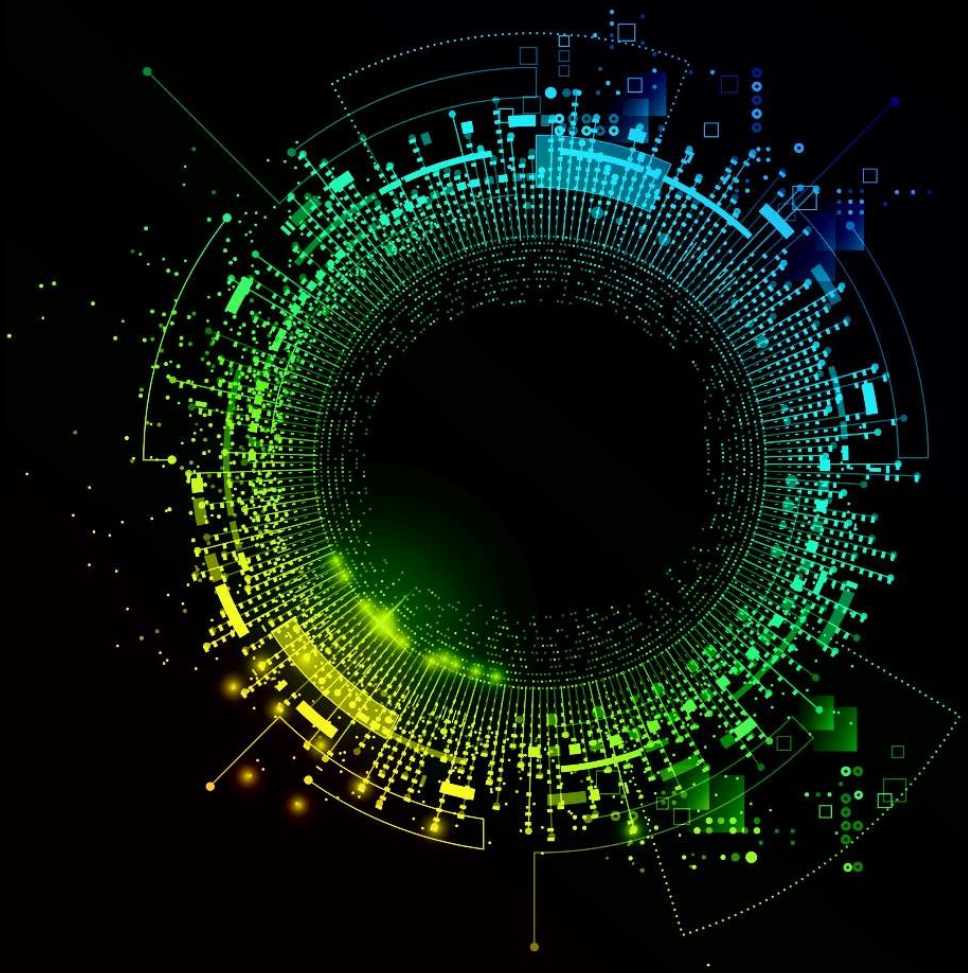

Navigating the artificial intelligence frontier

An introduction for internal audit

November 2023

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During 2023, artificial intelligence ("AI") captured the imagination of the world, fuelling discussion among businesses and policymakers by demonstrating the transformative power of how these technologies could redefine work. Whether interacting with vast sources of knowledge and business data through human-like interactions, accelerating how people work, or revealing new opportunities that were not previously possible through manual efforts, the benefits of AI are broad and far reaching.

AI is a broad domain. However, significant attention has been given to a specific field of AI known as Generative Artificial Intelligence ''GenAI'' following the mass global interest in applications like Open AI's ChatGPT. Recent research by Deloitte shows that a third[1] (32%) or approximately 4 million people in the UK who have used GenAI have done so for work. Given the opportunity GenAI presents, and the fact employees are using GenAI 'side of desk' for work tasks, it is no wonder that organisations are investing heavily in enterprise use cases. With the rapid acceleration and integration of GenAI into business functions, AI and accordingly GenAI risk management, will continue to be a hot topic for internal audit teams throughout 2024 and beyond.

For internal audit, this presents two key considerations; how to provide assurance over AI (including GenAI), and how to leverage its potential to evolve and innovate internal audit's own ways of working. In this publication, we explore these two faces of AI.

Internal audit's role in assurance over AI

AI and GenAI offer significant opportunities for organisations. At the same time, they present a frontier of new risks for boards and audit committees to navigate. To mitigate and minimise these risks, organisations are actively investing in the development of risk management frameworks, and controls to enable them to innovate with confidence.

These new AI controls will be needed to help manage data privacy and security risks, as well as ethical considerations and concerns about the reliability of outputs created by GenAI. Internal audit functions are also looking at the developing regulatory landscape and assuring that their organisation is preparing for the arrival of regulations, across all geographies they operate in.

In conjunction with the publication of the regulations and guidance, the pace of AI development and deployment for the UK is expected to intensify, as the UK government pushes to be a global leader in AI development and innovation[2].

Harnessing the power of AI to re-imagine internal audit's ways of working

Alongside their organisation's efforts to leverage AI, internal audit leaders are also trying to understand the potential impact and art of the possible from these tools on their own functions.

As a firm, we believe the integration and use of enabling technologies in internal audit, such as AI, is critical to helping functions maximise their impact and value. The digital landscape is broad, covering many other domains including automation, audit management systems, cloud-based solutions, visualisation, data analytics, and process mining. Whilst they can be deployed in isolation, the power of digital is in their combination. As such, internal audit functions need a strategic and coordinated approach across both the function and the internal audit lifecycle.

GenAI will play an important role within internal audit functions' digital strategies, not only in providing new capabilities but also helping to engage leadership and staff in continuous improvement and innovation by re-imagining traditional approaches. For those who are successful in digitising their functions, the rewards are clear – enhanced quality, increased assurance and better insights, new levels of productivity, increased staff satisfaction levels and greater impact on the organisation and for their broader stakeholders. Yet digital remains a significant gap and the 'number one' opportunity for many functions.

[1] Digital Consumer Trends 2023 | Deloitte UK

[2] Regulating AI: can the UK's proposed approach achieve both flexibility and clarity?

[3] Internal Audit 4.0 | Deloitte Global

Decoding the jargon: useful AI terminology to know

Before internal audit functions can hope to assure the risks of AI or look to explore the art of the possible from its use, internal auditors must acquire a baseline of AI fluency. To help you with your AI 101, we outline some of the key terminologies and basics below.

Artificial intelligence
Artificial intelligence is a broad 'umbrella' term given to the field of computer science that focuses on creating systems that can perform tasks requiring human intelligence.

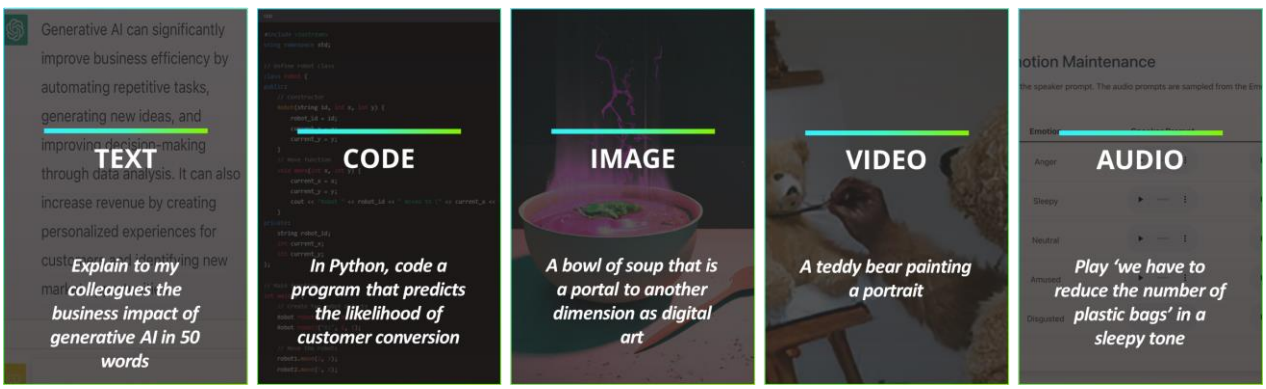
Machine learning
Machine learning refers to algorithms that make informed decisions and learn over time without being explicitly programmed to do so. Machine learning helps to train AI models to identify and predict patterns based on human processed data, rather than relying on hard-coded rules.

Deep learning
Algorithms that simulate human reasoning to make intelligent decisions and learn over time based on observed results. Deep learning is a powerful and advanced machine learning paradigm that leverages neural networks to improve model performance.

Generative artificial intelligence
GenAI is a highly sophisticated subset of AI using large parameter models to create content across a variety of modalities. The models which support the generation of content (often referred to as foundation models) are underpinned by advanced machine and deep learning capabilities.

Types of GenAI (modalities)

The primary GenAI models are focused around generating new content using our primary forms of communication, such as text and imagery. However, there are many variations and models continue to develop at pace. For simplicity, it can be helpful to think of the main categories as being able to produce the below:



Large language models

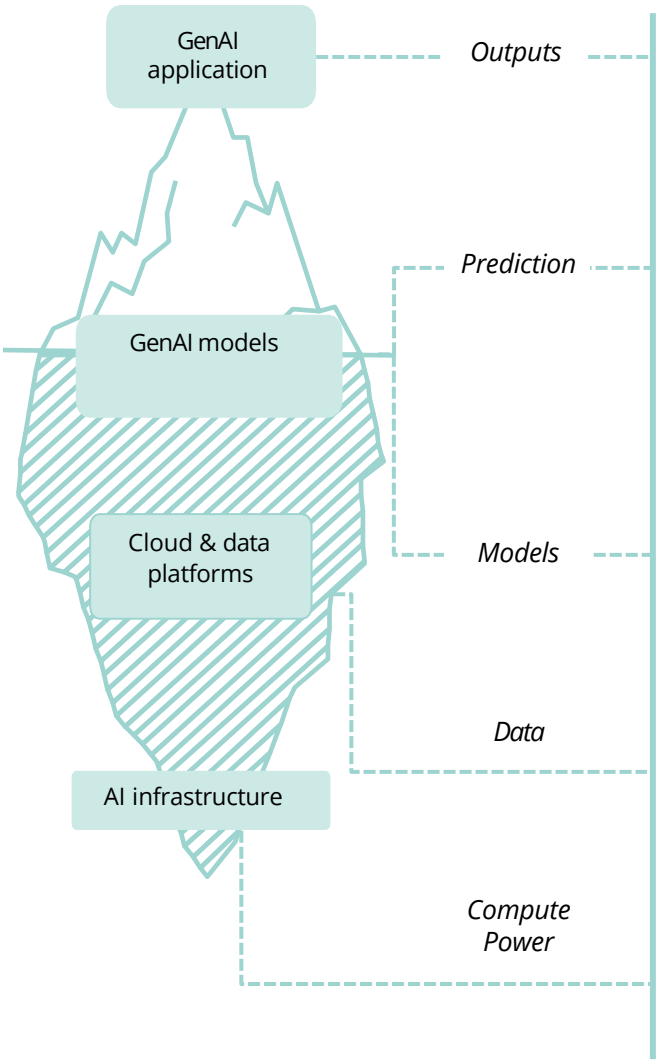
Of all the modalities, large language models ("LLMs") have gained most of the attention from organisations. Popularised through tools like Open AI's ChatGPT, LLMs are a specific type of text-based model which have been trained on petabytes worth of global data. The parameters within these models represent the model's level of understanding about each word and their context within the training data sets. In the case of LLMs, more parameters allow them to capture more complex patterns in the data it was trained on, typically leading to improved accuracy on language-related tasks.

At a simplistic level, LLMs predict an output based on inferences built on its training and the inputs it receives. Given the level of data they have been trained on, their ability to provide highly convincing and compelling responses, in a human-like interaction, is why they have gained such attention.

The mechanics of GenAI

GenAI is a highly sophisticated subset of AI. Whilst the vast majority of Internal Auditors will not need a deep technical understanding akin to data scientists, it can be helpful to appreciate the general mechanics of GenAI to consider where risks can arise and to determine the level of technical skills that an internal auditor may need to provide assurance over the organisations use of these tools.

How GenAI works



Applications…what we see

GenAI applications generate content across various modalities (e.g., text, image, video, audio) based on how the underlying model was trained.

Why do these applications seem so human?

Like traditional AI, foundation models are models (1) that predict outputs based on inferences built on the inputs it receives. However, through fine-tuning (2), prompt engineering (3) and adversarial training (4), these models can generate outputs geared towards meeting human intent.

What are foundation models?

OpenAI's GPT-4, and NVIDIA's Megatron are two examples of foundation models, specifically large language models, which use deep learning to process massive amounts of data to form 'memories' on the input datasets through tokenization (5), thereby shaping the models' parameters (6). There are common foundation model architectures (e.g., Transformer (7), Diffusion (8)) which drive the modalities for each model.

Training on the world's knowledge

Foundation models are trained on petabytes worth of global data to shape understanding, tone, and behaviour while considering human communication styles.

Powering our journey to tomorrow

The scale of the compute capacity required to train and process foundation models necessitates the usage of leading GPUs (graphics processing units) (e.g., A100 NVIDIA) and TPUs (Tensor Processing Units) (e.g., Google TPU v4) on scalable infrastructure.

Key terms

1. Model

A neural network that has undergone training to generate outputs based on a given input prompt

2. Fine-tuning

The process of refining foundation models to make them suitable for specific applications across various industries and domains

3. Prompt engineering

The act of creating or modifying the prompt given to a model to obtain an optimal answer or output

4. Adversarial training

The technique of pitting different deep learning models against each other in a training game or competition

5. Tokenization

The process of splitting text into smaller units and mapping to vectors and fed into models

6. Parameters

Level of understanding about each word and context within the training data sets

7. Transformer model

Model that can 'transform' generic words into context-aware representations. Google & U. of Toronto invented in 2017

8. Diffusion model

Construction of high-resolution images from noise. Mostly used in speech-to-image / text-to-image models

9. Temperature

A measure from 0 to n, where 0 is very consistent model output, and n would have more variation and creativity in generated output

What can AI do today?

The capabilities which AI can provide today are allowing organisations to challenge their ways of working and reveal new possibilities. Not all of these will be relevant to internal audit, but some could be applied across the internal audit lifecycle to evolve and innovate approaches. Example AI capabilities include:

Sense	
Sense physical data	**Sense visual data**
Sense light	Sense screen pixels
Sense sound	Sense keystrokes
Sense temperature	Sense mouse clicks

Perceive			
See objects	**See faces**	**See actions**	**Hear voices**
Detect objects	Detect faces	Detect motion	Convert speech to text
Classify objects	Recognize faces	Identify actions	Identify speaker
Perform OCR	Determine age	**Hear sounds**	Determine gender from voice
	Determine gender	Recognize sounds	Identify emotion in voice
	Recognize emotion		

Learn	
Learn by technique	**Learn facts and skills**
Learn from examples	Learn skills
Learn by trial and error	Learn facts
Learn by analysing structure	

Know	
Represent and store knowledge	**Retrieve information**
Populate global knowledge base	Retrieve relevant documents
Populate contextual knowledge base	Retrieve relevant answer units
Maintain truth	Retrieve specific facts

Communicate			
Understand language		**Understand and generate language**	
Classify text	Detect language	Translate languages	Generate narrative
Extract entities	Analyse sentiment in text	Answer questions	Generate image and video captions
Recognise relationships	Analyse emotion in text	Dialogue	
Cluster text	Analyse personality from text	Summarize text	

Plan	Act
Plan production	**Act in physical environment**
Plan robot motion	Convert text to speech
Plan routes	Move robot limbs
	Act in virtual environment
	Generate mouse clicks & keystrokes
	Generate animated avatar

Create	
Create text	**Create videos**
Create marketing content	Create custom videos
Create sales content	
Create support content	
Create images	**Create speech**
Create general images	Create custom voices
Create advertising images	
Create models	**Create chemicals**
Create 3D models	Create proteins

Reason and solve problems	
Infer	
Make logical inferences	Cluster
Make probabilistic inferences	Recommend
Classify	Predict numeric value
Solve problems	
Search for optimal solution	Optimize
Satisfy constraints	

Capabilities with most relevance and potential application to internal audit.

AI is not as new as you think…but with GenAI we are heading into unchartered waters

Before becoming too caught up in the GenAI hype, it is worth recognising that most people are already using AI in their daily lives without realising it. For example, tools like autocomplete, spellcheck, smart calendar scheduling, and suggestions on the most effective ways to visualise data in applications such as Power BI, are all using forms of AI. Natural Language Processing (e.g., Chatbots, sentiment analysis), speech recognition (audio to text), robotics and perception sensing (e.g., object detection) have been in existence for some time. Chances are your organisation, and potentially your own internal audit function is already engaged in forms of machine learning. If you have not yet explored existing AI capabilities, there are significant opportunities and benefits that can be gained before heading into the world of GenAI. However, the clear potential from democratising access and the acceleration in development of GenAI tools is creating very significant opportunities, but also new areas of risk that most organisations have yet to understand.

Internal audit's role in assurance over AI

GenAI presents a broad spectrum of risks, many of which are still emerging. Amongst the main concerns raised by GenAI are:

Risk	Description
Privacy	Personal information shared with third party Software as a Service AI may not comply with privacy laws and put customer/employee data at risk of exposure.
Intellectual property	Information gathered (e.g., by web scraping) may contain IP protected content and prompts must be carefully written not to leak any secret know-how. There are also challenges with protecting IP of content generated by AI.
Malicious behaviour	Generative AI tools may be targeted by adversaries to reveal sensitive information and/or take malicious actions on networks and data.
Ethical use	GenAI tools may be used in a manner not intended and to circumvent organisational policies, laws, and regulations E.g., submitting content in competitive events.
Hallucination	Models might output facts that are factually false. Sources and citations are unavailable for most models.
Bias	Bias in training data (e.g., over/under-representation of a population cohort, sexism, racism), then outputs generated could exhibit biases as well.
Model performance	Lack of considerations for model performance limitations (dependent on training data used) could lead to sub-optimal business outcomes (e.g., poor quality reports).

The regulatory landscape

There have been several developments in the AI regulatory landscape, which continues to move at pace. Guidance has been published to aid organisations as they navigate the use not only of GenAI, but all forms of AI. Some of the key voices in the regulatory landscape include:

- **EU AI Act (latest development from June 2023) -** The European Parliament AI Act, which is expected to come into action in Q1 2024, is a regulatory risk-based approach to classify AI systems and manage the development, distribution, and use of AI systems.
- **AI Regulation: A pro-innovation approach white paper (published in March 2023) -** Following the collaboration of multiple UK (United Kingdom) government departments, the national AI strategy outlines an innovation focussed approach to AI development. The white paper proposes investing in the long-term needs of AI ecosystems, and supporting the transition to an AI enabled economy, and establishing the right national and international governance of AI technologies. The white paper also outlines the UK government's plans to regulate AI, identifying AI as a critical technology. A new framework will encourage innovation in a responsible manner to drive growth and public trust making the UK a global leader in AI.
- **ISO AI risk management framework (published in February 2023) -** ISO published risk management guidance for organisations that are developing and deploying AI.
- **NIST (National Institute of Standards and Technology) framework (published in January 2023)**[4] - The NIST has collaborated with organisations from both public and private sectors to develop the NIST AI risk management framework. The guidance is voluntary and aims to help organisations understand the considerations that should be made during the design, development, use, and evaluation of AI systems.

4 What you need to know about NIST's AI Risk Management Framework

What should internal audit be doing for their boards and audit committees?

Whilst GenAI technology is still developing, it is already being adopted by organisations at pace. Internal audit functions are seeking to understand to what extent their organisation is using this technology, and to what extent they are planning to invest in it. As internal audit functions grapple with this new risk domain, we recommend the following activities.

01	**AI strategy and governance** Internal audit should consider their organisation's approach to the governance of AI. This should include a review of the organisation's AI strategy, business case(s) and to what extent AI risks have been considered. Consideration should be given to what extent senior executives have been involved in defining the AI strategy and associated guardrails, given they can have organisational wide consequences.
02	**Policy, standards and guidelines** Internal audit should consider reviewing any AI policy the organisation has developed, including acceptable usage guidance and/or policy which defines the parameters of AI system development.
03	**AI inventory** Internal audit should consider whether an AI inventory has been developed by the business. The development of an AI inventory records active and developing AI projects with details on their status and risk management considerations. Organisations are taking differing approaches to this but ultimately AI risks cannot be managed unless there is clarity over AI use.
04	**Regulatory readiness** Internal audit should understand how the organisation is staying up to date with the fast-moving regulatory environment. Organisations need to consider regulations in all the geographies they operate in and if this assessment is not thorough, they run the risk of having to 'roll back' deployed AI use cases which could cause significant business disruption.
05	**AI risk management and culture** Current risk management processes may need to be amended to ensure that risks associated with AI are proficiently covered[5]. AI risk management frameworks and risk assessments are being developed and these should be integrated into the current risk management processes and procedures to ensure systems utilising AI are effectively managed, governed, and monitored. Risk appetite statements may also need to be updated and many organisations are adapting existing governance arrangements to be fit for AI, such as AI ethics councils and the creation of AI centre of excellences.

[5] Embedding controls and risk mitigations throughout the GenAI development lifecycle

Harnessing the power of AI to re-imagine internal audit's ways of working

What about internal audit's own use of AI?

The use of more established AI capabilities (e.g., Natural Language Processing and Machine Learning) have been present within more advanced internal audit functions for some time, often found within analytics teams. As access to GenAI and data security issues are overcome, we expect to see internal audit functions of all shapes and sizes to significantly scale their use of GenAI. For now, the reality is that most internal audit functions have either not engaged in GenAI beyond exploration of ChatGPT or conceptual applications. Only a very few are actively developing proof-of-concepts, but this is just a matter of time. AI is coming and quicker than you might think; the genie is out of the bottle, and it is not going back inside any time soon. The good news is that GenAI it is not as big and scary as you might expect.

Enabling technologies are becoming increasingly accessible and this is only being accelerated through the wider efforts of organisational IT (Information Technology) functions looking at the same challenging questions. You do not need to become digital experts overnight or start replacing your auditors with a team of data scientists (although increasing your digital fluency is critical and being able to access some of these skillsets will be important).

A glimpse into the GenAI-driven internal audit lifecycle

The application of GenAI on internal audit's lifecycle is only limited by the imagination and creativity of teams. From our discussions with internal audit functions, the below applications and use cases are where many in the industry see potential.

Risk assessment	Plan development	Engagement planning	Execution	Reporting
Supporting auditor research and understanding of risk for a specific industry. Supporting audit universe creation e.g. guidance on universe design and process universe.	Supporting auditor research and understanding of risk, business processes and expected controls in advance of engagement planning. Suggested audits against the risk assessed audit universe. Suggested scheduling and resource allocation based on known constraints e.g. number of staff, their skills and seniority.	Supporting auditor research and understanding of risk and business processes in advance of planning. Suggested control objectives and test procedures based on in-scope risk areas. Suggested data sources and potential analytics tests. Generated scripts for data extraction and analytics execution. First draft of scope / terms of reference.	Analysis of data through natural language questioning. Suggested interview questions for different stakeholders' personas. Critical assessment of risk and control descriptions (e.g. if it covers who, what, where and when). Initial draft of workpaper. Drawing themes from interview notes / audio. Summation / interrogation of audit evidence documents. Initial workpaper review and QA. Initial draft of issue / observations.	Initial draft report. Initial draft report review and QA. Editorial QA e.g. simplifying language, sentiment analysis. Summation of reports for audit committee summaries. Generation of video / audio reporting. Customised stakeholders' communications. Report language translation. Drafting emails to communicate the audit report.

AI is only one element of internal audit's digital landscape. Significant benefits can be achieved through automation, audit management systems configuration and design, cloud-based solutions, visualisation, data analytics, and process mining. Whilst they can be deployed in isolation, the power of digital is in their combination. As such, internal audit functions need a clear digital strategy and coordinated approach across the function. For further information on how functions should approach a purpose driven and digitally powered future, we recommend reading our Internal Audit 4.0 framework.

What should internal audit be doing to accelerate their adoption of AI?

01	**Increase your digital fluency** Start engaging with learning and development now. You do not need everyone to become data scientists, engineers, or digital experts. However, being familiar with the terminology, types of capability and potential for these tools will help accelerate adoption.
02	**Determine your digital strategy and potential** Determine how GenAI can help you achieve your broader functional strategy and outcomes. Systematically review your ways of working to identify potential use cases. But do not limit your digital strategy to just GenAI, there are many applications and use cases relating to other areas of machine learning such as natural language processing, sentiment analysis, topic modelling, linear regression and neural networks that can already be harnessed and provide opportunities for experimentation. Equally, do not overlook the opportunities that exist from maximising functionality from audit management systems, embracing analytics, visualisation, and other tools such as process mining.
03	**Engage with your technology teams** Understand your organisation's stance towards AI, both from a data privacy and security perspective for open solutions, and its appetite for shaping existing solutions within the safety of your organisation's environment.
04	**Clean up your data** The quality of AI both in terms of its training and its output will be a product of the quality of data it is given and looking at. Many organisations (including internal audit) have poor data quality, version control or out of date versions of documents that have not been removed from intranets for years. Whilst you are waiting for some of the tools to become more accessible, getting your house in order will pay dividends to the value AI can deliver. For example, analysing your risk and control frameworks, scope documents, findings, and recommendations to create a tokenised database of internal audit content could help turn currently untapped information into a goldmine of knowledge and insight.
05	**Work through, and manage the risks** The risks outlined in this publication are as relevant to internal audit's use of GenAI as they are to the business. Good governance is critical, and functions should be challenging themselves to put in robust governance processes and controls around the use, development, testing, access, and ongoing monitoring of AI within internal audit.
06	**Develop a culture of innovation** Organisational culture can make or break the success of innovative technology and new ways of working. The limits of what GenAI could be used for are only contained by the imagination of individuals. Functions that have a culture of innovation, curiosity and the willingness to experiment have usually fared better than those that were less willing to embrace change. Functions should consider innovation programmes; encourage experimentation and reward the right behaviours.

Where do we go from here?

Whether it is the assurance over risks posed by AI or exploring how you might use these technologies in your own internal audit function, learning and improving your digital fluency is key. GenAI will also require a mindset shift. Its prevalence and the speed at which it is evolving will drive a need to re-imagine the human-technology relationship; interacting with GenAI will be part of the daily routine, enabling new possibilities but bringing the potential for over reliance on AI outputs.

Organisations, including internal audit functions, will need to assess the risks and opportunities associated with GenAI, balancing the benefits from efficiencies gained through reduced manual effort with the need to check and validate accuracy. What is clear is that tools this powerful, offer so much potential that they will be here for the long term. The attention given to GenAI and the investments being made means internal audit will need to engage and do so quickly.

GenAI is a fast-moving and developing field of AI. As a firm we are taking the same journey as many of our clients. We believe GenAI has the potential to transform the internal audit profession and have already made significant investments in both our approach to assuring GenAI and supporting organisations in their use of these technologies. If you would like to talk to our dedicated team of experts, please get in touch.

Authors

David Tiernan

Digital Internal Audit and Innovation

+44 113 292 1520

datiernan@deloitte.co.uk

Nanette Scott

Digital Internal Audit and analytics

+44 20 7007 9911

nanettescott@deloitte.co.uk

Lewis Keating

Artificial Intelligence Risk and Assurance

+44 113 292 1193

lkeating@deloitte.co.uk

Owen Jackson

Internal Audit Advisory Lead

+44 2920 26 4297

ojackson@deloitte.co.uk

UK internal audit contacts

Karl Williams

Corporate and Public Sector Internal Audit Lead Partner

+44 20 7007 6645

kdwilliams@deloitte.co.uk

Aaron Oxborough

Financial Services Internal Audit Lead Partner

+44 20 7007 7756

aoxborough@deloitte.co.uk

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